A HISTORICAL STUDY

OF THE

IRON HORSE SYSTEM

1965 - 1973

RETURN TO THE
ESC HISTORICAL OFFICE

FREEDOM THROUGH VIGILANCE

USAF SECURITY SERVICE

15 December 1974

UNITED STATES AIR FORCE SECURITY SERVICE

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Prepared by:

JAMES E. PIERSON
Operations Historian

Under the Supervision

of

BOB W. RUSH
Command Historical Officer

15 December 1974

UNITED STATES AIR FORCE SECURITY SERVICE

San Antonio, Texas

Monkey Mountain

Foreword

(U) (TS-CW) This history, *The IRON HORSE System*, is another in our regular series of historical studies covering the command's mission (operational) activities. Basically, it is the story of the development, testing, refinement, and operational employment of a system which automatically processed SIGINT data and thereby permitted the near real time use of the intelligence by tactical commanders in Southeast Asia (SEA). More specifically, the *IRON HORSE* system introduced the capability to display the enemy's tracking of both friendly and hostile aircraft operating over North Vietnam, Laos, (b)(1) the Gulf of Tonkin, and portions of (b)(1) . This gave the battle commander a near real time picture of the air situation over SEA at any given time.

(U) (S-CW) We have used six chapters to tell this story. Chapter I, "A Warning System is Developed," discusses the requirement for a SIGINT service in SEA that was more responsive to tactical needs; *viz.*, the development of new methods of applying SIGINT to the immediate use of pilots over enemy territory. This chapter covers in some detail the development, testing, and operational use of a manual processing and reporting system for this purpose, known as Project *HAMMOCK*. Chapter II, "Project *IRON HORSE*," outlines the many problems involved in bringing the *IRON HORSE* system from a concept to full operational use, and the transition from the manual *HAMMOCK* system to the automatic *IRON HORSE* system.

(U) (S-CW) Chapter III, "Support Coordination Advisory Team," discusses the increasing complexity of the processing and reporting of tactical SIGINT at the 6924th Scty Sq at Da Nang and the Tactical Air Control

Center-North Sector (TACC-NS) on Monkey Mountain near Da Nang, and the establishment of the SCAT to improve the overall system. Chapter IV, "Ammunition Dump Disaster," tells about the explosion of the Marine Corps ammunition dump on Da Nang AB in April 1969, the extensive damage which it caused to the 6924th Scty Sq operations building, the disruption of the *IRON HORSE* system, reconstruction of the *IRON HORSE* facility, and the eventual restoration of the system.

(U)(SCN) Chapter V, "*IRON HORSE II*," covers the development and installation of a backup system for *IRON HORSE*, known as *IRON HORSE II*. This chapter delves into the surveys to locate a suitable site for the backup system in Thailand, setting up the van complex, and the return of the original *IRON HORSE* system to NSA. Chapter VI, "Establishment of Alternate TACC-NS at Udorn," covers the detailed planning involved in the anticipated closure of the TACC-NS at Monkey Mountain and the shifting of this responsibility to the Alternate TACC-NS at Udorn, Thailand; development of an *IRON HORSE* capability at the TACC-NS; and the impact of the drawdown of the war on the role of *IRON HORSE*.

(U) James E. Pierson wrote this history, using as primary source materials the *IRON HORSE* files from DCS/Operations, unit histories, historical studies, case files, and other historical documents on file in the USAFSS Archives. Mary E. Toddes typed the final manuscript and prepared the glossary and table of contents.

(U) We are especially grateful to Mr. P. B. Stokes, Directorate of Systems Technology; Col. Harlan C. Hobbs, Director of Special Operations; and Col. Anthony J. Dibaggio, Directorate of Communications-Electronics,

vi

DCS/Operations; for their careful review of the draft manuscript. We also wish to express our appreciation to the unit historians, to the unit commanders for their interest in the USAFSS Historical Program and support of their unit historians, and to all others throughout the command who support and contribute to the USAFSS Historical Program. It is only through their cooperation, support, and interest in the history of this command that historical studies such as this are possible.

(U) Comments concerning this historical study and requests for additional copies should be addressed to HQ USAFSS/HO, San Antonio, Texas 78243.

BOB W. RUSH
Command Historical Officer

Table of Contents

Introduction

(U)(SCI) Early in 1965, the intensifying air war over North Vietnam (NVN), and its close proximity to the Chinese Communist (CHICOM) mainland, brought about the need for a single responsible agency to be knowledgeable of the entire air picture in Southeast Asia (SEA).

(U)(SHVCCO) Perhaps the most productive program born of this need was Project *HAMMOCK*, a system designed to introduce NVN (b)(1) radar tracking data into the overall U.S. radar network of SEA disguised as unclassified U.S. radar tracks.

(U)(SHVCCO) Under Project *HAMMOCK*, the 6924th Security Squadron (Scty Sq) took selected COMINT-derived NVN (b)(1) radar tracks, converted them into normal lateral-tell radar network format, and further assigned a lateral-tell track designator to give the illusion of having come from U.S. radar.

(U)(SHVCCO) The squadron then passed the plots to its remote site atop Monkey Mountain, South Vietnam (SVN), *via* a KW-26 Operations Communication (OPSCOMM) circuit. From there, the plots were relayed directly *via* aerial cable to a U.S. Air Force (USAF) plotter inside the radar site at the 7th Air Force (7AF) Control and Reporting Center (CRC), who in turn put the plots into the 7AF and 7th Fleet radar lateral-tell network.

(U)(SCI) In view of the increased reactionary capability by the North Vietnamese Air Force (NVAF) to U.S. air strikes over NVN, this *HAMMOCK* service provided the tactical commander with valuable additional information upon which to direct U.S. air operations. As the air war over NVN reached its peak in 1966-67, Signals Intelligence (SIGINT) collection from the NVAF air surveillance network steadily increased.

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(U)(SEW) Certain incidents, such as U.S. aircraft inadvertently over-flying CHICOM territory, also made it mandatory that the tactical commander be provided continuous flight following data. Hence, the manual and time-consuming method of processing SIGINT data under Project *HAMMOCK* gave way to automatic processing of SIGINT data for near real time tactical usage under a new project called *IRON HORSE*.

(U)(SCW) Not only were the SIGINT collection and processing techniques streamlined under Project *IRON HORSE*, but sophistication of the enemy's defenses were also automated through electronic procedures. To cope with the automated defense system of the enemy, it became necessary to know in advance his capability and his defensive intentions, and apply this knowledge to the tactical environment.

(U)(SCW) Through the analysis of collected SIGINT, the defenses of the North Vietnamese (b)(1) provided some insight into their capabilities. To apply this knowledge to the daily conduct of the air war over North Vietnam was the purpose of *IRON HORSE*. The *IRON HORSE* output (video tracking display) was instantly transmitted from the point of intercept at Da Nang (6924th Scty Sq) *via* a data circuit to a remote display scope at the Tactical Air Control Center, North Sector (TACC-NS) atop Monkey Mountain.

(U)(SCW) At this point, the SIGINT was fed into a TACC-NS computer disguised as radar data and fused with U.S. radar reflections. Thus, the TACC-NS battle commander had both SIGINT and U.S. radar inputs to view and respond to the air picture over SEA.

(U)(SCW) The *IRON HORSE* concept of operations was published in 1966, and the system became operational at the 6924th Scty Sq on 30 November

1967. However, it was 17 December 1967 before the first data was passed to the TACC-NS over the *IRON HORSE* system. The manual *HAMMOCK* method ceased on 3 February 1968; however, it was retained as a backup to the *IRON HORSE* system. The new system was phase-tested in an operational status, and modifications to equipment and minor changes in computer programming were made on the spot.

(U) (SCW) NSA developed the *IRON HORSE* system and installed it at the 6924th Scty Sq at Da Nang and the 7AF TACC-NS on Monkey Mountain. *IRON HORSE* introduced the capability to display the enemy's tracking of friendly (North Vietnamese (b)(1)) and hostile (U.S.) aircraft operating over North Vietnam, Laos, (b)(1)) the Gulf of Tonkin, and portions of (b)(1)

(U) (SCW) The *IRON HORSE* system was composed of several components of sophisticated electronic equipment, designed and programmed for the purpose of rapid conversion and video display of SIGINT information produced from intercepted radio signals. The conversion process involved a sequence of manual, mechanical, and electrical events which were accomplished between the intercept of the signal and the actual display of the SIGINT information.

(U) (SCW) By the electronic manipulation of intercepted air surveillance data, emanating from North Vietnamese (b)(1) tracking facilities, the TACC-NS battle commander had a near real time picture of the air situation over SEA at any given time. In addition to the capability to avail SIGINT for immediate tactical use, the *IRON HORSE* system also automated most of the processes required in the routine exploitation of intercepted traffic.

(U) (SCW) Through exploitation of intercepted NVN (b)(1) communications,

USAFSS could follow, and in most cases predict, the target behavior of the North Vietnamese $(b)(1)$ military forces. The defensive posture and reaction capability of the NVN and portions of the $(b)(1)$ defensive forces, when reacting against U.S. air strikes, was maintained by the 6924th Scty Sq.

(U)(SCI) Changes in the defenses, as well as the defensive reactions of the two military forces, were reported instantaneously to all consumers. Time delay, incurred through the manual *HAMMOCK* system, had detracted significantly from the tactical value of the SIGINT data. *IRON HORSE* eliminated this time delay and put the information in the hands of the TACC-NS battle commander immediately after intercept. As expected, this near real time fusion of NVN $(b)(1)$ radar reporting with U.S. radar reflections enhanced the battle commander's capability to direct and control U.S. aircraft in strikes against NVN targets.

(U)(SCI) The *IRON HORSE* system continued to function in the desired manner through the end of 1968. Although the air war over North Vietnam was curtailed considerably by President Johnson's announcement to limit U.S. strikes below 19 degrees north latitude, the *IRON HORSE* system still provided the tactical user with unique and timely data.

(U)(SCI) Following the cessation of all strike activity over NVN, SIGINT reflections of air operations over SEA were severely limited. The *IRON HORSE* video display system provided the TACC-NS battle commander with NVN $(b)(1)$ reflections of U.S. conducted flights in areas contiguous to North Vietnam and Communist China. In view of the political implications involved in keeping U.S. aircraft from overflights of both the NVN and China landmass, the *IRON HORSE* system became a valuable

aid in enabling the TACC-NS controllers to exercise more direct control over any impending situation.

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Chapter I

A WARNING SYSTEM IS DEVELOPED

(U)(TSCW) By early 1965, the nucleus for collecting and reporting signal intelligence (SIGINT) to 7AF was in being at Det 2, 6925th Radio Group, Mobile (RGM)* at Da Nang AB, South Vietnam. The major task at that point was to augment the service, increase the speed of reporting, and make SIGINT as comprehensive and viable as was possible.

(U)(TSCW) But before this could be done, communications had to be improved; collection, processing, and reporting procedures and techniques improved; the services of all SIGINT agencies drawn together; and it all had to be done within available USAFSS resources. Assuming that an offensive air war was coming, 7AF and USAFSS officials had laid the ground work for services as they were anticipated at the end of 1964. But as the war progressed, tactical SIGINT was to play a far greater role than ever before experienced in USAF combat annals.

(U)(TSCW) A SIGINT service predominantly national in nature had to be changed to one more responsive to tactical needs. New reporting procedures had to be developed and refined. New methods of applying SIGINT to the immediate use of pilots over enemy territory had to be initiated. A new squadron, capable of acting as an intermediate intercept processing center, had to be organized and manned. So the job was not only to provide the most useful SIGINT possible to those waging the air war over North Vietnam, but to develop the best way in which to use the SIGINT that was provided.

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* Det 2, 6925th RGM, was redesignated Det 2, 6922nd Scty Wg, on 1 July 65, and became the 6924th Scty Sq on 1 Oct 65.

Demands for SIGINT Service Increase

Gulf of Tonkin Incident Triggers Requests

(U) (TSCW) After the Gulf of Tonkin incident in August 1964, 7AF (at that time 2nd Air Division) asked for SIGINT coverage of North Vietnamese air defense and other flight service communications to theoretically extend the line of radar coverage to forecast attack on South Vietnamese targets by the enemy. Then, when air strikes began over North Vietnam in February 1965, the pressure for SIGINT service began to mount steadily.

NSA Working on New System

(b)(1)

Project HAMMOCK is Born

NSA's System Implemented at 6924th Scty Sq

(b)(1)

(b)(1)

HAMMOCK Extends Range of U.S. Warning Network

(b)(1)

Plans for HAMMOCK Testing Readied

(b)(1)

(b)(1)

(U) (TSCW) Radar coverage extended to almost all of North Vietnam except the extreme northwestern area in the vicinity of the South China-North Vietnam-Laos borders, along with half of Hainan Island to the north. The SIGINT gathered from (b)(1) North Vietnamese radar tracking facilities would allow complete coverage almost regardless of terrain, and at least part of the unreliability and limitation of the radar equipment at its outer reaches would be overcome.[8]

HAMMOCK Testing Begins

(U) (TSCW) The test was set up in two phases: (1) three days, starting on 21 October 1965, at the 6924th Scty Sq to test the system between the squadron and the Monkey Mountain CRP, and (2) immediately afterward, the cross-tell operations with the Navy would be tested for about a week. Working for about two hours during each shift in the beginning, the plotting board facilities at the CRP immediately became jammed and had to be

enlarged. The KW-26 teletype circuit proved too slow to handle the job, but this had been expected and would be remedied when a KY-8 voice circuit was installed later. NSA put an observer with the 7th Fleet during the cross-tell tests, and he felt that as soon as the bugs were worked out, the *HAMMOCK* system could be put into a full 24-hour-per-day operation.[9]

(U) (TSCW) Unfortunately, during the test period, flight activity over North Vietnam was low, but the results made both Air Force and Navy officials enthusiastic. Security did not appear to be a serious problem so long as operating standards were met and maintained.[10]

(b)(l)

Air Force and Navy Want Fulltime HAMMOCK Service

(b)(l)

(b)(1)

Fulltime HAMMOCK Service Commences

(b)(1)

(b)(1)

(b)(3)

(U)(TSCW) The recommendation had merit, because the warning picture be-
came muddled by the command and control situation which centered on the
Air Warning Center at 7AF. The 6924th Scty Sq soon found itself in the
middle of a duplicative and unwieldy reporting situation. The squadron
explained to the 6922nd Scty Wg:[16]

> . . .We are passing plots to *PANAMA*. We are passing same
> plots to 2AD. We are passing MIG warning to 2AD. We are passing
> border violation warnings to *PANAMA*. Notice the incongruity in
> sending MIG warning to 2AD and border violation warnings to *PANAMA*.
> Suggest that the duplication/incongruity be removed by permitting
> *PANAMA* to transmit the warnings based on plots that we forward to
> them. Further suggest that 2AD has no requirement for timely for-
> warding of plots since we are now sending border violation warnings
> directly to *PANAMA* and that in the case of MIG warnings 2AD is only
> relaying what we pass to them. 2AD has no way of analyzing or am-
> plifying the plots we send to them and therefore they can only re-
> lay the situation as we pass it to them. Recognize their require-
> ment for wrap-up of activity and believe that this is available in

the DRV daily air summary. During critical situations such as in shootdown etc. we could be able to verbally recap the activity and pass to 2AD *via* OPSCOMM. This would indeed be a relief on man-power/communications requirement at USA-32.

(U) (TSCW) The 6924th Scty Sq felt that this had to be done soon to effectively use the people and communications facilities available. However, it was some months before any big change took place. In the meantime, the squadron operated as planned, and the service did improve with installation of the KY-8 secure voice circuit between the 6924th Scty Sq and its detachment on top of Monkey Mountain, replacing the slower KW-26 secured teletype.[17]

HAMMOCK Concept Proves Valid

(U) (TSCW) Over the next few months, the *HAMMOCK* concept proved valid, although communications, procedures, and operating details made it less than completely stable. The shortcomings were not in the collection and analysis service. In fact, the 6924th Scty Sq earned a reputation for professionalism in its work. The difficulty was in getting the SIGINT product to the desired consumers--in most cases, airborne fighter pilots over North Vietnam. They had a great deal to do, and communications on the guard channel were getting heavier all the time as the command and control system was being worked out. Thus, the danger existed that the pilot in question would not get an alert which affected him.[18]

Importance of Warnings Highlighted

(U) (TSCW) The record showed that warnings were passed from the 6924th to the CRP *PANAMA* in plenty of time to be used, but were not always used successfully. As an example, on 17 April 1966, an F-105 was destroyed by attacking MIGs well after the warning had been passed. The North Vietnamese interceptors were tracked in the enemy air defense system,

two warnings were issued, but the U.S. fighter did not react.[19]

(U) (TSCW) This example is not intended to imply that all efforts were unsuccessful because just 10 days later SIGINT was given full credit in the first U.S. air victory over a MIG-21. A flight of F4C Phantoms was engaged by MIG-21s, and the event was later debriefed by the U.S. pilots in the presence of an NRV(C) representative, who later stated:[20]

> . . .The F4C pilots were alerted through receipt of first the *Yellow* and then the *Red* warnings, then to MIGs active in assigned target areas while enroute. They were further alerted that MIGs were in their immediate area and they were therefore prepared for attack which resulted in destruction of MIG-21. It is this type of SIGINT support which significantly contributes to the success of U.S. operations. The personnel of the [6924th Scty Sq] and *SILVER DAWN* deserve a well done in assistance in downing the MIG-21.

(U) (TSCW) As air operations moved closer to the CHICOM border, the importance of border warnings became more critical. On 8 May 1966, U.S. fighters engaged MIGs over the border and were successfully warned of their position. Although the initial contact was made to the south, the action took them to the border area and a potential incident was averted.

Warnings Not Received; International Incident Results

(U) (TSCW) But on 12 May 1966, the 6924th Scty Sq saw North Vietnamese (b)(1) air defense facilities tracking a flight of four U.S. aircraft from 10 to 50 miles east-northeast of Lao Kay and followed them as far as 25 miles inside Communist China. Beginning at 0820 Da Nang time, the squadron passed the first of seven alert messages to the CRC *PANAMA*, and the reporting center relayed the warnings in turn.[21]

(U) (TSCW) Due to the geographical position of the action, *PANAMA* sent its warnings to the Navy's control aircraft (C-121 *BIG LOOK*) to be relayed. Unfortunately, the C-121 had aborted its mission, and the warnings were not received. *PANAMA* later tried to pass the information

through a Navy destroyer in the Gulf of Tonkin, but could never confirm that the warnings were passed. What followed was a touchy international situation which led to a major control reorganization.[22]

(U) (TSCW) The mission in question was a flight of four EB-66 electronic countermeasure (ECM) aircraft escorted by F4Cs, and the enemy immediately sent up four MIG-17s to intercept them.* They were engaged and one MIG was knocked from the sky. Unfortunately, it fell on the Communist China side of the border. The wreckage was reported near Ma-Kuan, some 17 miles inside Communist China. The furor that followed was rather heated as there were charges by the CHICOMs and denials by the U.S. The CHICOMs released photographs of auxiliary fuel tanks and unused air-to-air rockets, and made their usual threats about expanding the war. SIGINT showed that their claim was valid and the act brought on a full scale Pentagon investigation at 7AF.[23]

JCS Sends Team to Investigate

(U) (TSCW) Marine Brig. Gen. Robert G. Owens, Jr., arrived in SEA a week later with a team of operations experts to see for themselves. Clearly, the discrepancy was in the communications between the CRC and the aircraft. USAFSS felt that SIGINT support had been as good as could be expected, and this was later confirmed, but among flying personnel there were differences of opinion. The pilots said they had not received the warning. But they also said they had not at any time crossed the border; a fact solidly disputed by SIGINT as well as the CHICOMs. SIGINT's

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* Whether there was any direct warning from the ACRP was not made clear; the only record being from the action of the ground site.

DIRECT SERVICE

PROJECT HAMMOCK

6924SS
↓
TACC-NS
↓
STRIKES FORCES & NAVY ELEMENTS

COMMANDO EXPRESS

6924SS

PACAF ←   → 7AF

WEATHER REPORTING

Flash ↙   6924SS   *Flash* ↘

CRS SAN MIGUEL   ↓ *Immed*   NRV (C)

↓   FUCHU   ↓

COMSEVENTHFLT   DET 14, 1ST WEAGP
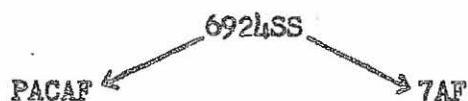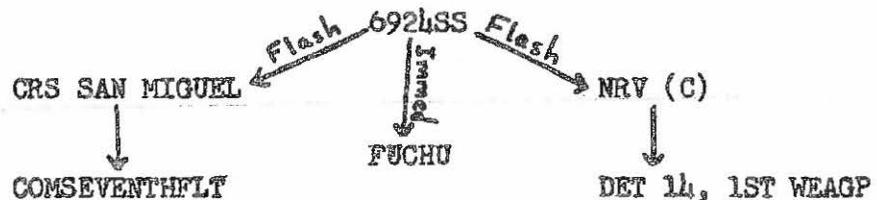
~~SECRET SPOKE~~

SECRET

COMMUNICATIONS LINKS

SSB Fast Talk

BIG LOOK   SAC   COMMANDO LANCE

CRS   CRS
Saigon   6924SS   San
                                                 Miguel

NRV(C)   7AF/6994   AFSSO   JSPC   6922SW   USM-808
Saigon   Saigon   Bien   Okinawa   Clark   Phu Bai
                         Hoa   AB, P.I.

Ops Remote   TACC-NS
Monkey Mountain   Monkey Mountain
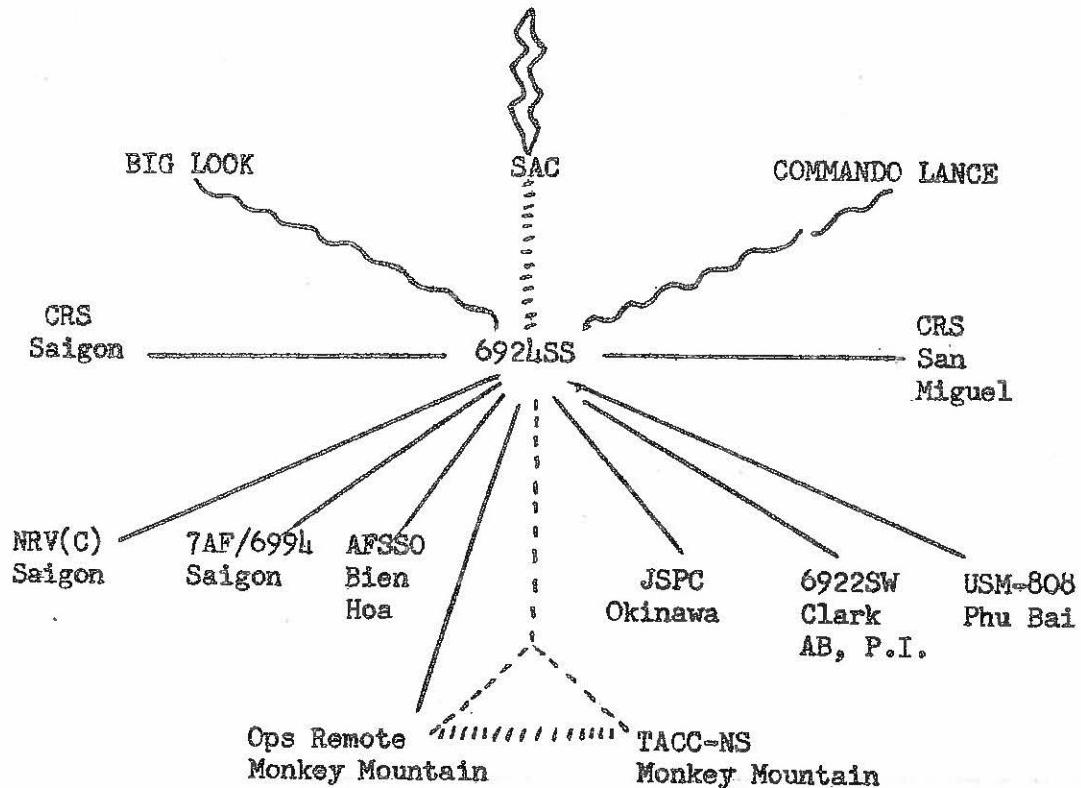
～～～	GRC-137/KW-7
———	KW-26
- - - -	KY-8
///////	EE-8

SECRET

Looking west southwest from atop Monkey Mountain near Da Nang AB, South Vietnam, home of the Tactical Air Control Center-North Sector (TACC-NS).
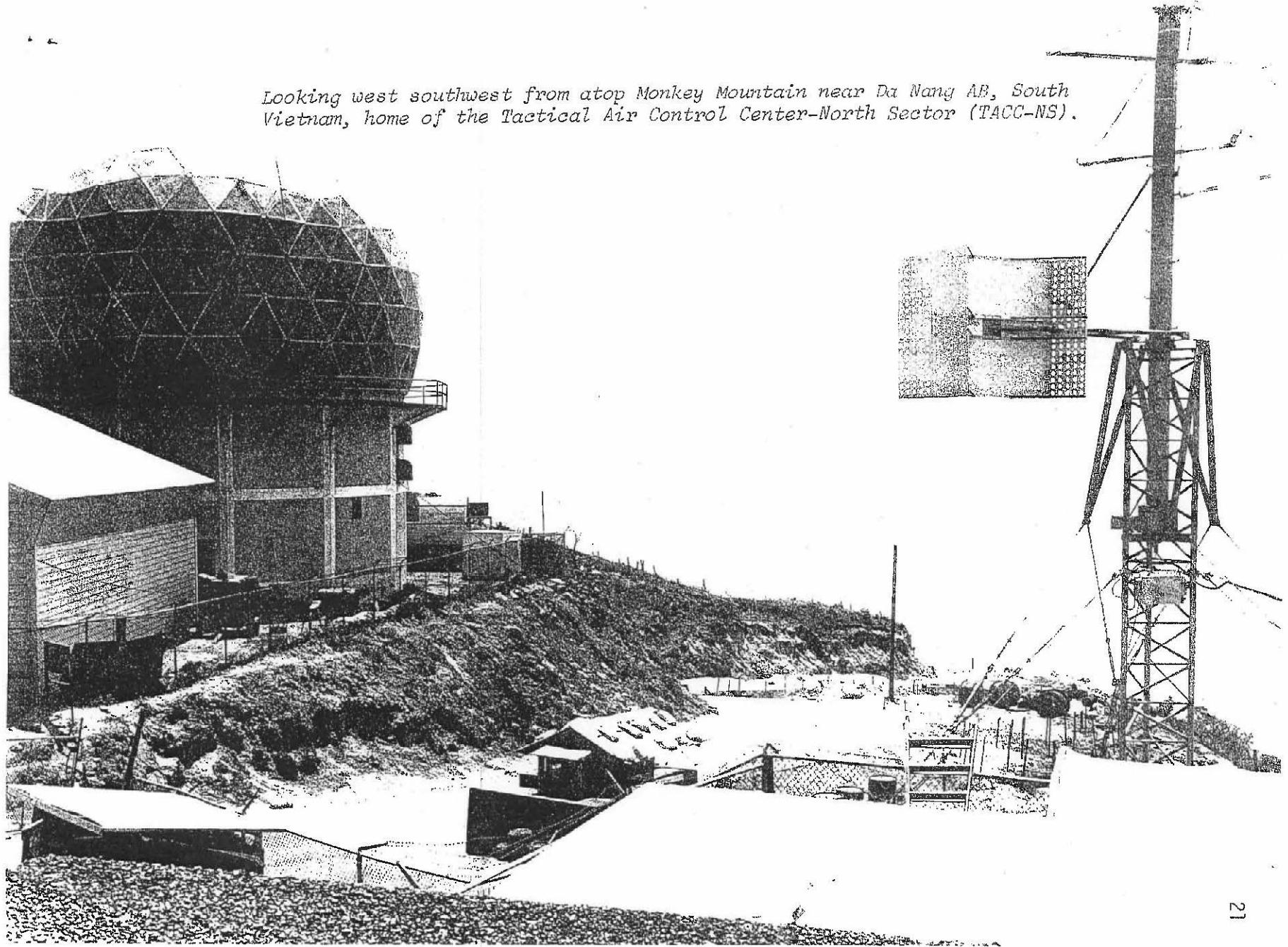
TOP SECRET UMBRA

validity over visual positioning by airborne pilots could be assumed.[24]

(U) (TSCW) When General Owens visited the 6924th Scty Sq, the USAFSS unit was well armed with charts and tracks of the operation to back its claims that the aircraft were some 25-30 nautical miles (NM) from the point claimed by the pilots. But the General was not there to point fingers; he was there to correct a problem. Nevertheless, the squadron reported to the Pacific Security Region (Pac Scty Rgn) on 21 May:[25]

> Our SIGINT operation [and] reaction is clear cut and complete and I can't see anybody pointing a finger at us. You may have a problem with [the] JCS team when they get back there in supporting validity of SIGINT information as intercepted, and disproving any possibility of deliberate spoofing by the CHICOMs. I frankly cannot see any firm or conclusive determination as to just what happened on 12 May coming from the JCS team as they are coming up with many contradictions supposedly based on facts.

(U) (TSCW) Maj. Gen. Louis A. Coira, USAFSS commander, later said that the Joint Chiefs of Staff (JCS) team was indeed satisfied and further that ". . .all parties had nothing but commendations for actions of the 6924th Scty Sq. . . ."[26]

JCS Team Has Two Recommendations

(U) (TSCW) After its investigation, the JCS team came up with two recommendations to prevent future such incidents: (1) all USAFSS ACRP aircraft and Navy BIG LOOK aircraft should be equipped with transmitters to automatically echo MIG alerts and border violations from CRP PANAMA, and (2) 7AF should have more control over the ACRPs to be sure they were scheduled in orbit during strike operations.[27]

(b)(1)

(b)(1)

ZACC-NS Established As Separate Facility

(b)(1)

(b) (1)

SIGINT Operating Restrictions Eased

(b) (1)

(b)(1)

(U) (TSHVCCO) Previously, only tracks within a 325-nautical-mile radius
of 19-30N 107-30E, meeting altitude restrictions commensurate with U.S.
radar tracking capabilities from the center point, could be passed to
TACC-NS under *HAMMOCK*. Upon completion of the NSA evaluation of U.S.
SEA radar capabilities, all altitude restrictions were removed, and the
area covered by *HAMMOCK* was extended to include a rectangular area from
16-00 to 23-30 degrees north latitude and from 100-00 to 112-00 degrees
east longitude.[35]

(U) (SCW) All tracks within this 297,000 square nautical-mile area were
forwarded as *ROMEO* tracks. Each *ROMEO* track was sequentially assigned a
track number from 51 to 99. Using the assigned *ROMEO* track number the
initial tracking data was passed in a prescribed format; *i.e.*, track
number, identification (nationality), number of aircraft, altitude,
position in geographical reference (GEOREF) coordinates, and zulu time.
Subsequent track movements were passed using the assigned track number
and an abbreviated format; *i.e.*, zulu time, number of aircraft, and al-
titude.

(U) (SCW) When the 6924th Scty Sq intercepted tracking data which was
outside the rectangular area of coverage, the information was passed as
a "codeword" track* to the squadron's operating site on Monkey Mountain
via secured KW-26 teletype communications. These tracks were then passed,
using essentially the same format as for *ROMEO* tracks, to personnel on

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  * Codeword tracks were tracks not meeting *HAMMOCK* restrictions and
which therefore could not be released to persons not indoctrinated for
COMINT. The reason for this was that the source of the track could not
be effectively disguised.

TOP SECRET UMBRA

the TACC-NS battle staff who were cleared for special intelligence. However, "codeword" tracks were seldom passed.

(U)(SCI) In order to provide the best possible direct service to the TACC-NS battle staff, *HAMMOCK* requirements were extended to include intercept from the 6922nd Scty Wg.

(b)(1)

The squadron then passed it *via* KW-26 OPSCOMM as *ROMEO* tracking to TACC-NS. Generally, however, the 6924th Scty Sq was already intercepting the tracking and including it with *HAMMOCK* reporting.

(U)(TS//VCCO) With the new criteria for *HAMMOCK*, it became possible for the KY-8 secure voice circuit, used for passing tracks from the 6924th Scty Sq to *MOTEL*,* to be moved from the senior controller's area at TACC-NS (the only area secured for SIGINT material), to a position behind the main plotting board. Thus it was possible for all non-codeword tricks to be displayed for immediate use by all personnel assigned to TACC-NS. Codeword tracks were passed to the cleared KY-8 operator at *MOTEL* in the same manner as *HAMMOCK* tracking; however, they were not displayed on the main plotting board.[36]

(U)(TS//VCCO) Until the expansion of Project *HAMMOCK*, the 6924th Scty Sq was in active participant in the threat alert program employed in SEA. The 6924th Scty Sq was responsible for passing MIG alerts which were comprised of predetermined codewords, the location of the MIGs, and the

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* *MOTEL* was the call sign used by TACC-NS when communicating *via* the KY-8.

time. This information was passed to TACC-NS for relay to airborne forces whenever SIGINT reflected Communist MIGs posing a threat.[37]

(U) ~~(TSHVCCO)~~ Due largely to the expansion of *HAMMOCK*, the need for the squadron to issue the alerts no longer existed; therefore, effective 12 February 1967, the requirement was rescinded. At the same time, the responsibility for issuing the daily MIG/SAM/Border Warning Summary* was transferred to TACC-NS, thus ending the squadron's direct participation in the SEA threat alert program.[38]

(b)(1)

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* A daily report issued by the 6924th Scty Sq listing all MIG/SAM/Border warnings issued by *COMMANDO LANCE*; all MIG warnings issued by the squadron; and all Border warnings issued by TACC-NS from *HAMMOCK* tracking.

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Chapter II

PROJECT IRON HORSE

(U) (SCI) As the TACC-NS developed during 1966 and into 1967, NSA went to work on a sophisticated reporting and display system to rapidly convert enemy air defense intercept into usable intelligence so it could be given to the battle commander as quickly as possible.

(U) (SCI) The need to provide a single responsible agency, the TACC-NS, with immediate knowledge of the entire air picture over North Vietnam and Laos became more and more imperative as the North Vietnamese reaction to U.S. air strikes mounted. As U.S. air operations became more frequent and widespread, the need to guard against overflight of CHICOM territory became more critical, so the need to eliminate the time-consuming manual processing of enemy surveillance communications was quite clear.

NSA Develops A New System

Calls It Project IRON HORSE

(U) (SCI) The enemy's surveillance system was, at the same time, becoming more automated and sophisticated, rendering the old system of manual communications unacceptable. *HAMMOCK* was limited in the quantity of data which could be provided and its quality and timeliness were adversely affected by the number of manual steps involved. The system developed by NSA to replace *HAMMOCK* was called the Field Exploitation System (AN/UYK-6), and the project for its development was designated Project *IRON HORSE*.[1]

(U) (SCI) Project *IRON HORSE* improved the *HAMMOCK* procedures by automating the manual steps. For one thing, teletypewriters would replace the manual typewriters and feed data directly into computers for on-line processing of tracking data. Input data would be edited and decrypted

29

through a computer program and presented to scope analysts on 21-inch cathode ray tube (CRT) displays (similar to a TV tube). The scope analysts would recognize critical tracking data and send it to the tactical commander by simply pushing the appropriate console tiles or by using a light pen. The computer would automatically forward the data to TACC-NS through a data communications circuit. Both the TACC-NS and the 6924th Scty Sq would have display scopes, showing the data as it was being passed in the form of plots with background geographical information. This data consisted of the latest COMINT reflections of:[2]

1. North Vietnamese and Chinese Communist aircraft active over North Vietnam (b)(1)

2. The location of all unidentified aircraft.
3. The location of U.S. strike aircraft as follows:
    a. When active over Laos.
    b. Within 30 nautical miles of the Sino-North Vietnamese border
    (b)(1)
    c. When an air engagement was imminent.
    d. For search and rescue operations.
    e. During any other critical activity involving U.S. aircraft, including their location over Communist China during inadvertent overflights.

USAFSS Sends E&I Team to Da Nang

(U)(SC) A rocket attack against Da Nang AB on 15 July 1967 damaged the new building in which *IRON HORSE* was to be housed, causing it to be temporarily installed in vans. On 26 October 1967, an Engineering and

Installation (E&I) team from USAFSS arrived at the 6924th Scty Sq to install the AN/GGC-15 (teleprinter equipped manual Morse) positions. Three H-1 vans were configured with five positions each, and another *IRON HORSE* configured H-1 van was airlifted from NSA, giving the 6924th Scty Sq four vans with a total of 20 intercept positions.[3]

(U)(SEW) Between 5-9 November 1967, NSA shipped two computer vans, one maintenance configured van (all M-313 type), and one S-141 communications shelter to Da Nang. With 10 days after the vans arrived, hook-up to the existing surveillance and warning room was completed. By the end of November 1967, the *IRON HORSE* system was 90 percent completed and had been checked out as far as possible without operational input data.

IRON HORSE Initially Tested at NSA

(U)(SEW) Actually, involvement of the 6924th Scty Sq with Project *IRON HORSE* began some six months earlier, on 15 May 1967, when the squadron began a test to gather material to be used with the system being built at NSA. Between that time and 15 June 1967, some 32 tapes were sent to NSA, using selected Morse targets which had been most successful in providing warning data to 7AF through Project *HAMMOCK*.

(b)(1)

Operators Sent to NSA for Training

(U)(SCW) Meanwhile, during the late summer and early autumn of 1967, the 6924th Scty Sq sent 10 Morse intercept operators to NSA for training on the equipment. By the time the *IRON HORSE* equipment began arriving at

Da Nang, four of the 10 operators had returned to begin teaching other operators who would ultimately be involved in operating the equipment.[5]

(U)(SCN) Over the last half of September and through October, the squadron gathered such housing facilities as it needed and made whatever arrangements it could for the installation and engineering teams and technicians who would install the equipment. The physical layout was patterned after the *HAMMOCK* operations, and for the most part the equipment arrived when it was needed. Personnel, as usual, became a problem, but didn't cause any serious delays.[6]

(U)(SCN) There were some computer modifications that had to be made, but they were minor in nature. While there was some congestion and compression in the training schedules because of the late arrival of some people, all were ready to go to work on 1 November 1967, which was the programmed operational date. That date was not met, however, as there was some delay in equipment delivery and the arrival of written material for operation and maintenance, which was being prepared by NSA.[7]

Operational Date Nears

(U)(SCN) By mid-October 1967, only 18 of the 72 people authorized for *IRON HORSE* operation were on site at the 6924th Scty Sq, but they continued to trickle in over the next month and a half, checking out the equipment as it arrived. There was little difficulty in converting the people to the new operation. However, at the TACC-NS on Monkey Mountain, 7AF said it would be able to man neither its end of the KW-7 crypto system nor the display scopes, so the 6924th Scty Sq had to provide the people.[8]

(U)(SCN) By 28 November 1967, all of the wiring installations were

finished and tested, at least as far as they could be tested without actually having operational inputs into the system, which were scheduled for some two days hence. Although *IRON HORSE* became operational on 30 November 1967, the first data was not passed to the TACC-NS until more that two weeks later; partly because of a communications problem which had plagued the installers for several weeks and partly because it was a phased transfer between *IRON HORSE* and *HAMMOCK* so that routine air defense service would not be disrupted.[9]

IRON HORSE Acceptance Testing Begins

(U) (SHVCCO) On 15 December 1967, *IRON HORSE* acceptance testing began at the 6924th Scty Sq. The objectives were:[10]

1. Determine if the *IRON HORSE* system would function properly in the operational environment of the 6924th Scty Sq.

2. Determine if the system was functionally compatible with the site operation. Could the system be integrated into the processing and reporting cycle without delay in delivery time of consumer reports?

3. Determine if the personnel subsystem was adequate both in numbers and training for operations and support areas.

4. Determine if the communications support subsystem was adequate in terms of numbers of circuits, transmission modes and rates, and transmission reliability.

5. Determine if any revisions were necessary to achieve suitability.

6. Determine if system documentation, operational, and engineering maintenance were suitable for site use.

7. Determine if adequate emergency operating procedures were specified for operating the *IRON HORSE* system under any contingencies.

(U)(SHVCCO) To assist HQ USAFSS in making its evaluation of the *IRON HORSE* acceptance test, the 6924th Scty Sq initiated three reports. They were:[11]

1. Field Reports. Field reporting was normally accomplished by completing a service test questionnaire which was prepared by HQ USAFSS and sent to the 6924th Scty Sq before the test started.

2. Summary Reports. An electrical report was submitted every 10 days during the test summarizing the information contained in the HQ USAFSS questionnaire.

3. Final Report. At the conclusion of the acceptance test, a final report was to be prepared to fully document the test.

(U)(SCW) During the remainder of December 1967 and into January 1968, the testing schedule of the *IRON HORSE* system continued at an accelerated pace. Numerous Mission Control Notes (MCNs) were written by *IRON HORSE* analysts to assist data input, the operator and analytical effort, and to aid the Console I analysts who were required to expeditiously feed computation data into the system. After operational testing of these MCNs, recommended changes to Annex I of Technical Instructions (TECHINS) 1002 were forwarded to NSA for formal adoption.[12]

(U)(SCW) On 4 January 1968, an AN/GGC-15 (AG-22) radio telephone position was put into the *IRON HORSE* system on a test basis. The position was tasked against North Vietnamese air surveillance tracking which was being voice transmitted. The same format and procedures that applied to the manual Morse inputs were used for the radio telephone position. The radio telephone operators experienced very little difficulty with the AG-22 equipment and the transition from a manual to an automated system

with live input produced few problems.[13]

(U)(SEW) The computer program accepted and displayed the data from the radio telephone position in the same manner as that from the manual Morse positions. A few minor additional operator comment entries were developed for operator use. These required only a slight additional workload for the operator. The input from the radio telephone positions proved to be extremely valuable to the entire system. It enabled the squadron to maintain continuity on nets changing modes of transmissions during significant, high interest strike activity. The position functioned efficiently in the system and was operated 16 hours daily.[14]

(U)(SEW) The use of this position was terminated in early May 1967 when the entire squadron mission was transferred to the new operations building. Since the position was authorized for training, it was not reinstalled in the new building. However, in view of the highly successful results obtained through this test, the AN/GGC-15 equipment was authorized for installation during FY-69.[15]

Programming Problems Cause Delay

(U)(SEW) Meanwhile, the 6924th Scty Sq commander called a meeting on 14 January 1968 to determine the possibility of accepting the *IRON HORSE* system for direct service reporting operations. However, after careful analysis, the squadron decided to delay accepting the system for a period of 10-14 days. This decision was based on programming problems which affected the delivery of data to the TACC-NS.[16]

(U)(SEW) Due to these programming problems, modifications were made to the software locally with support provided by NSA programmers through OPSCOMM coordination. However, the problems persisted and, finally, in

March 1968, NSA sent an *IRON HORSE* programmer team to the 6924th Scty Sq
to help correct and refine the software programs. During the team's
stay at Da Nang, the following modifications were made to the system:[17]

1. Deletion of garbled plots.

2. Instant recall and display of tracks that were 15 minutes or more
   old.

3. Scope display on radio arbitrary designator (RAD) which was trans-
   mitting tracking reports.

4. Increase in the on-line printout capability to 20 different tracks.

5. Selection and display of tracks in a 30-mile radius.

6. Printing of tracks that were sent to TACC-NS *via IRON HORSE*.

7. Current position of any selected tracks in GEOREF and latitude and
   longitude displayed on the scope.

(U)(SⒸⒾ) By the end of March 1968, the final modifications were com-
pleted, and the system had been successfully tested. As a result, the
modified system was accepted on 27 March 1968.[18]

IRON HORSE Reporting Revised

(U)(CⒽⓋCⒺO) On 2 April 1968, USAFSS cancelled the requirement for the
72-hour progress reports and the 10-day summary reports and in their
place established a quarterly report beginning with the 4QFY68. A few
days later, the off-line electronically forwarded machine retrievable
data of air activity (ELFAIR) program was modified to provide a sorted
record by case notation, frequency, transmitter RAD call signs, time,
and date. To accomplish this sort, one computer, one tape control unit,
six tape drives, an RD-277 punch, a line printer, and a slave printer
were required. Although the sort required a longer period of system
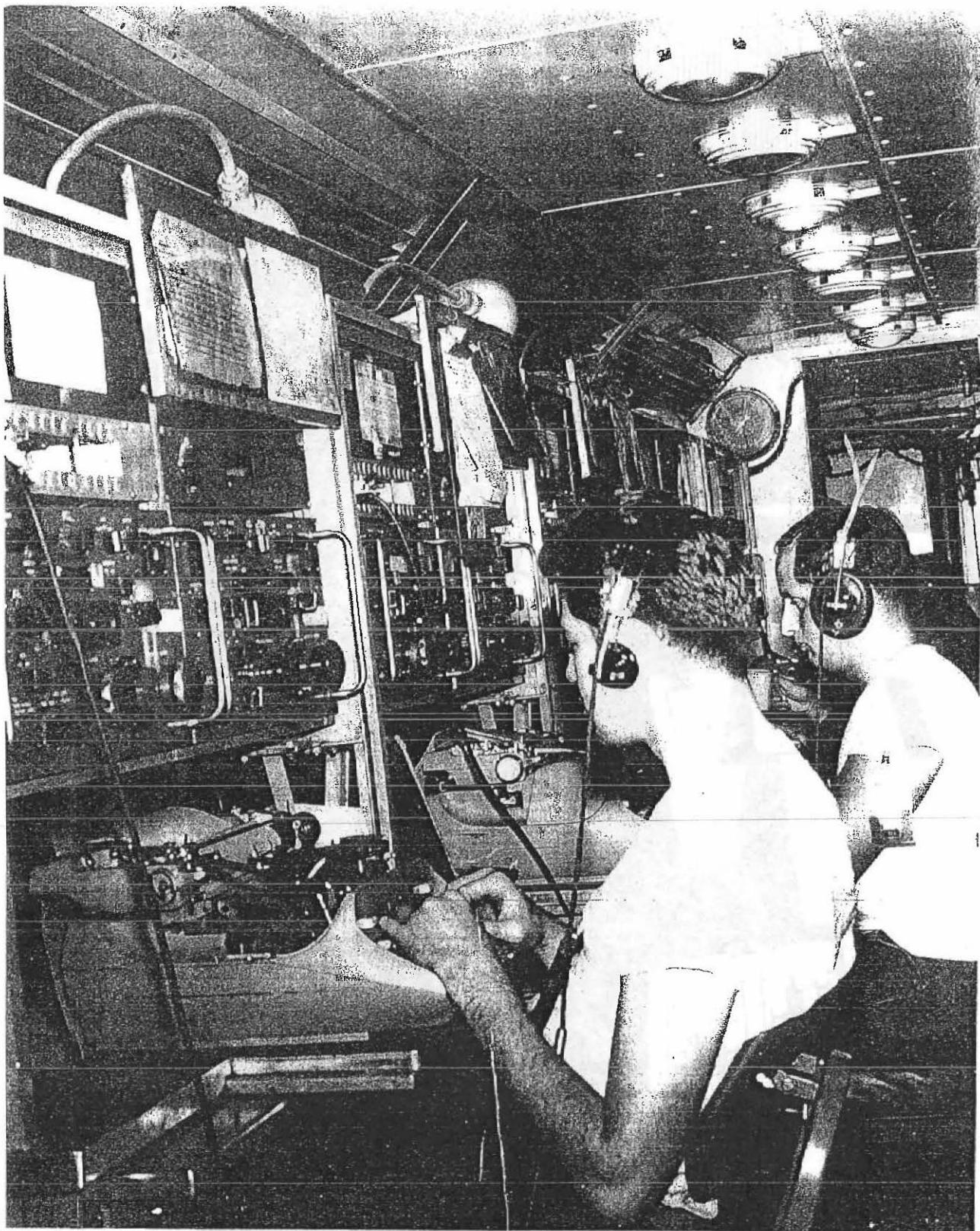
IRON HORSE configured MB0016D intercept positions in the van complex at the 6924th Scty Sq, Da Nang AB, RVN, April 1968.
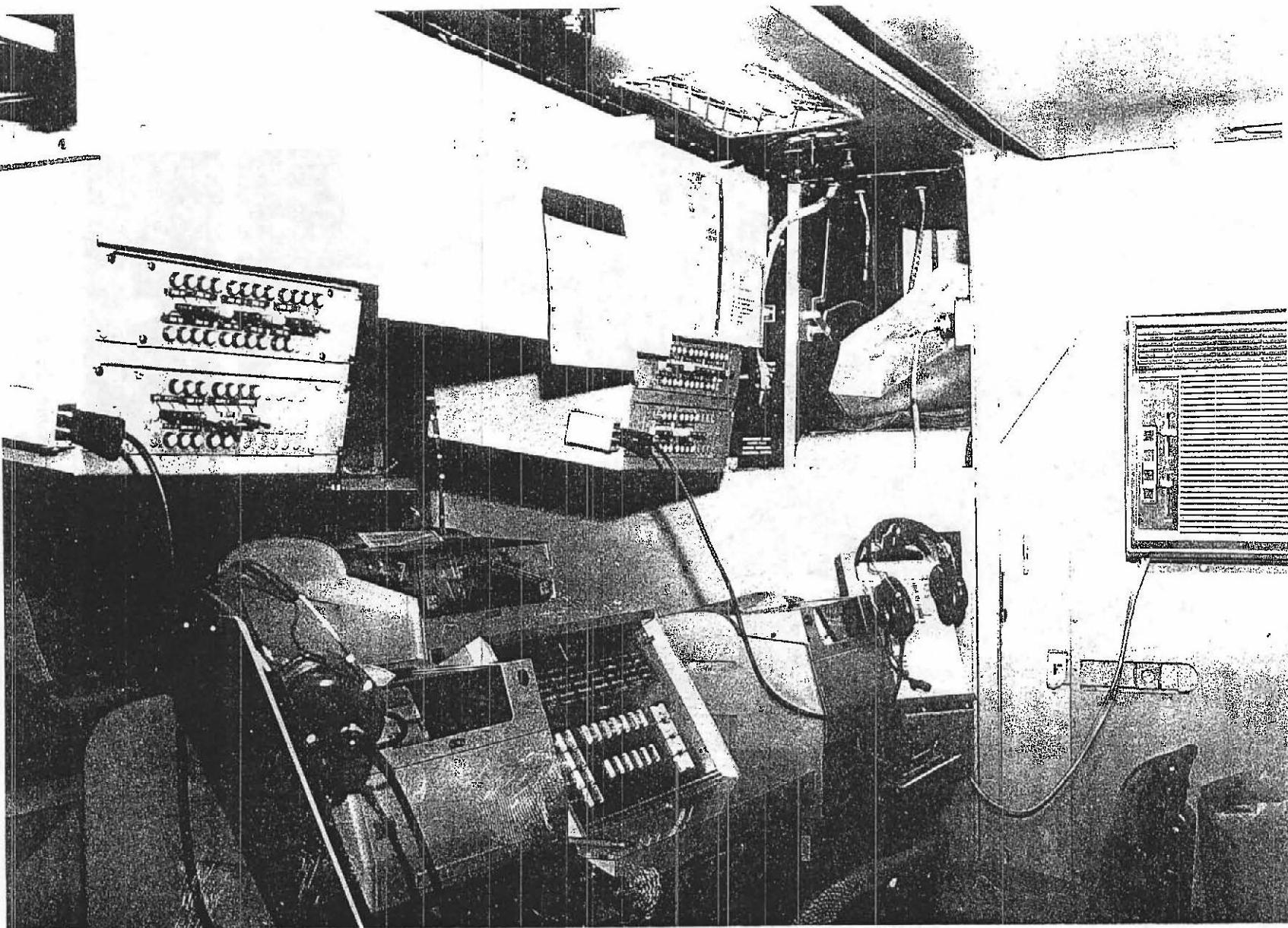
IRON HORSE Edit Console No. 1 and Intercom in the van complex at
the 6924th Scty Sq, Da Nang AB, Republic of Vietnam, April 1968.

down-time, there was no loss of direct support as the TACC-NS computer was down for maintenance during the 6924th Scty Sq's off-line ELFAIR processing period on the mid-shift.[19]

(U)(SCW) On 10 May 1968, the Director of the National Security Agency (DIRNSA) informed the 6924th Scty Sq that the off-line ELFAIR program was excellent and after further testing from 13 to 15 May 1968, operational status could be assumed. Some problems were encountered as inherent characteristics of the *IRON HORSE* program, required for direct consumer support through the TACC-NS interface, which were not completely compatible with the refined ELFAIR format requirements. Adjustments were made to the traffic profiles and unusual or unique tracking reports were entered by analysts at their edit positions. These actions resolved the incompatibility problems.[20]

IRON HORSE Installed in Permanent Facility

Removed from Vans

(U)(C) The *IRON HORSE* system was removed from the M-313 vans and permanently installed in the new operations building during 6-8 May 1968. No problems were encountered during the maintenance test conducted on 9 May 1968, and full operational status was resumed on 10 May.[21]

Timeliness of IRON HORSE Reporting Studied

(U)(SCW) During 1-20 June 1968, the 6924th Scty Sq conducted a study of the timeliness of all tracking reports processed by the *IRON HORSE* system. Specific points examined were:[22]

1. Time difference between the interim time of the tracking message and the actual zulu time the message was passed.

2. Time required for transmission of information from the Da Nang

mainsite to the Monkey Mountain (TACC-NS) display *via* the *IRON HORSE* system.

3. Time required for entering the necessary computation tables for initial intercept, subsequent tracks, and up-dates.

(U) *(SCW)* The results of the study were as follows:[23]

1. The difference in the internal time of a plot and the actual zulu time the plot was passed, considering all plots from all sources, averaged 21 seconds later than zulu time for NVN traffic

(b)(1)

2. The time of transmission of information from the mainsite to TACC-NS was negligible and once a track had been selected to be sent to TACC-NS, all subsequent information was automatically forwarded. These tracks were forwarded *via* the *IRON HORSE* console in a matter of milliseconds.

3. The time required to enter computation tables for initial intercept, subsequent tracks, and up-dates depended upon the frequency of the plots, the location of the plot, the activity level, and the source of the tracking information. The time required to display the initial plot at TACC-NS was approximately 10 seconds and all subsequent plots were automatically forwarded.

More Data Available to Consumer

(U) *(SHVCCO)* The advent of the automated *IRON HORSE* system on 30 November 1967 permitted a greater volume of data to be inserted into the air situation display, but with fewer people, and virtually without human intervention in transfer and display of information.[25]

(U) *(SHVCCO)* At the TACC-NS, the *IRON HORSE* input was automatically

inserted into the BUIC II* system, and through an interface operation, the data was forwarded into the Marine Tactical Data System (MTDS) and Navy Tactical Data System (NTDS) recipient stations. It was theoretically feasible at this point to provide (b)(1) North Vietnamese flight following data from the transmitting target activity to an NTDS recipient in the Gulf of Tonkin within eight seconds.[26]

New Strategy of Operation Needed

(U)(S//CCO) A strategy for IRON HORSE operation had to be developed. This could be accomplished only through actual operation. For example, the IRON HORSE operator scopes were capable of displaying the tracking outputs on 25 manual Morse positions. It was immediately determined that the display of a great number of tracks became extremely confusing to the operator and as a result affected his response time. Consequently, it was concluded that certain targets would be suppressed from display until specific track continuity could be established.[27]

(U)(S//CCO) As the continuity was developed, more data was allowed to enter the display scope. Once the track was selected for forwarding, the operation became completely automatic all the way from the North Vietnamese (b)(1) operator to the ultimate U.S. user without intervention.[28]

Processing Refined

(U)(S//CCO) The IRON HORSE system was initially developed to process manual Morse input. Experimentation at the 6924th Scty Sq perfected a technique for voice intercept inputs. This was accomplished through

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* BUIC II, Backup Interceptor Control System. The primary system used by TACC-NS and ATACC-NS for COMBAT LIGHTNING operations.

on-line translation of (b)(1)　　North Vietnamese voice Air Defense

communications. The intercept operator copied the voice transmission,

mentally translated the data passed, and typed it on the AG-22, which

was electronically connected to the *IRON HORSE* computer. Once in the

system, the data was treated like the manual Morse input. The total

system capability was increased through this latter innovation because

both voice and manual Morse communications could be reflected through

an automatic display. Comparative timeliness of the *HAMMOCK* and *IRON*

HORSE systems was as follows:[29].

	Project *HAMMOCK*	Project *IRON HORSE*
Da Nang to TACC-NS	30 sec - 2 min	8 sec - 1 min
Da Nang to NTDS	12 min - 30 min	8 Sec - 3 min

[*Author's Note: The minimum figures show minimum time required for*

communications. The timely alerting of 7th Fleet using IRON HORSE to

link the 7 AF BUIC II system with the NTDS is especially noteworthy.]

(U) ~~(S//GCO)~~ Project *HAMMOCK* continued as the primary mode of entering

SIGINT data into the threat alert system until the introduction of the

automated *IRON HORSE* system on 30 November 1967. *IRON HORSE* consisted

of a collection subsystem located at the 6924th Scty Sq and a consumer

subsystem at TACC-NS on Monkey Mountain.[30]

(U) ~~(S//GCO)~~ The collection subsystem used on-line electrical outputs

from Mod 35 teletypewriters at manual Morse positions to feed into a

two-computer/two-display console-data communications terminal system.

Air tracking data was automatically forwarded to the TACC-NS *via* a secure

2400-bit-per-second data circuit.[31]

(U) ~~(S//GCO)~~ The consumer subsystem consisted of a data communications

terminal with a single computer-two display console system, plus a digital interface to the TACC-NS BUIC II computer/display system. Both *IRON HORSE* and BUIC II air tracking data were rerouted back through the *IRON HORSE* consumer subsystem for retransmission to the Navy NTDS ships of the 7th Fleet.[32]

IRON HORSE Logistics a Problem

Planning for Spare Parts Poor

(U) Standard ground collection equipments had long been in the USAFSS inventory, so most logistic problems had been anticipated and the flow adjusted correctly. The airborne equipments were taken care of through arrangements made by the flying commands or through a periodic IRAN* in the case of the electronic equipments.[33]

(U) In the case of *IRON HORSE*, logistic support of the system was complicated by the compressed lead time available prior to deployment. As a consequence, spare parts selection was performed by NSA and the contractor. This resulted in procurement of many unneeded spares. In the opinion of the USAFSS *IRON HORSE* logistics programmer, Capt. David J. Neukamm, had NSA provided for Air Force participation in the selection of the spare parts kits, Air Force technicians would have eliminated parts which were available within normal USAF supply channels, as well as those items which did not need to be procured in great quantity because of projected low failure rates.[34]

(U) In addition, without federal stock numbers (FSNs), the using units encountered difficulties in replenishing their stock through Air

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* IRAN - Inspection and Repair as Necessary.

Force supply channels. Lack of proper identification data also delayed entry of *IRON HORSE* spares into the base supply account at Da Nang. Consequently, the Pac Scty Rgn dispatched a team of specialists on temporary duty (TDY) to Da Nang to assist in identifying and loading *IRON HORSE* spares into the IBM 1050-II computer systems.[35]

USAFSS Solves Spare Parts Problem

(U) Through this, and similar extraordinary management efforts, logistic support of the *IRON HORSE* system was maintained with no serious impairment of operations capability. Simultaneous with the developments at Da Nang, the Air Force Cryptologic Depot (AFCD) was developing a depot-level support capability at Kelly AFB. Again, lack of proper identification data slowed this process. Nevertheless, depot capability was generated in sufficient scope in time to ensure continued support of the system.[36]

IRON HORSE Replaces HAMMOCK

HAMMOCK Becomes Backup System

(U) (S&?) When *IRON HORSE* became operational, it replaced the *HAMMOCK* system for direct service reporting to TACC-NS. *HAMMOCK* procedures became the secondary method for providing real time service and was used only when the *IRON HORSE* system failed. *HAMMOCK* procedures were implemented on a daily basis for a two- to four-hour period on the mid-shift when the TACC-NS BUIC II system and the *IRON HORSE* system were receiving scheduled maintenance. Consequently, the *HAMMOCK* reporting system remained an important procedure for the surveillance and warning center personnel at the 6924th Scty Sq.[37]

(U) (S&?) In order to provide the best possible direct service to the

TACC-NS battle staff, *HAMMOCK* requirements were extended to include appropriate intercept from the 6922nd Scty Wg. Whenever the 6924th Scty Sq's mission was interrupted due to power failure or Communist rocket attacks in the Da Nang area, the alternate intercept coverage plan (AICP) was implemented and the 6922nd Scty Wg provided *HAMMOCK* service to the TACC-NS *via* the *COMFY RICE** circuit.[38]

IRON HORSE a Significant Improvement Over HAMMOCK

(U) (SEW) When the *IRON HORSE* automatic display system became operational it effectively replaced and significantly improved upon the manual *HAMMOCK* system for providing near real-time tracking data to the TACC-NS. The system became an integral, highly reliable part of the 6924th Scty Sq's air surveillance processing and tactical reporting mission to 7AF. Throughout the first half of 1968, numerous refinements were made to the data automation program and perfected operational requirements were fulfilled. These improvements contributed significantly toward the successful accomplishment of both the TACC-NS and squadron mission operations by providing the following:[39]

1. A complete up-to-date visual display of all air activity over North Vietnam, (b)(1)   the Gulf of Tonkin, and most of the Laos and (b)(1)   areas. This near real-time graphic display of air activity proved most valuable to the surveillance and warning center in the constant vigil for air activity which developed into tactical and SIGINT reporting situations and other critical

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* A call-up contingency circuit between Monkey Mountain and the 6922nd Scty Wg at Clark AB, Philippines, for AICP implementation.

activity.

2. Automated ELFAIR reports.

3. Automated *COMMANDO EXPRESS* reports.

4. Automated information which assisted the mission management section in providing timely feedback to the operations flights illustrating areas for training emphasis, processing improvement, and other potential problem areas.

Planning Begins for Digital Interface

Manual Switching Still Required

(U) (S//GCO) By July 1968, *IRON HORSE* data was being routinely passed in digital format from the 6924th Scty Sq to Monkey Mountain for display on BUIC II consoles located in the TACC-NS operations room and an *IRON HORSE* console in the adjacent USAFSS area. However, entry into the *SEEK DAWN* computer for display on the BUIC consoles at TACC-NS still required manual switching actions at the BUIC console.[40]

(U) (S) Plans for a full digital interface, allowing the data to pass directly from the Univac CP-818 at Operating Location (OL) 1, 6924th Scty Sq to the Burroughs GSA-51 *SEEK DAWN* computer, were well underway. The necessary OU-40/U groups contained three interface units (IU). *IRON HORSE* track data from the 6924th Scty Sq passed through one IU at 1200 bits-per-second. It was reformatted and entered into the CP-818 computer for processing and then was transmitted through a second IU at 1300 bits-per-second for entry into the GSA-51 computer. The third IU, at 1200 bits-per-second, was used for the receipt and transmittal of data from and to the Marine Tactical Data System (MTDS) and the Navy Tactical Data System (NTDS). Digital data received from MTDS/NTDS entered *via* the third IU,

was reformatted, processed by the CP-818 computer, and transmitted to the GSA-51 computer *via* the 1300-bits-per-second IU. *SEEK DAWN/IRON HORSE* tracking forwarded to MTDS/NTDS flowed in reverse order (*i.e.*, GSA-51 to IU-1300 to CP-818 to IU-1200 to MTDS/NTDS).[41]

IRON HORSE Digital Interface Testing Begins

(U) (S) The *SEEK DAWN* Interface Computer Program (SDICP), providing the necessary software for the interface, had also been received. On 15 July 1968, *IRON HORSE* digital interface testing began and direct exchange between the CP-818 and GSA-51 computers was accomplished for the first time. Operational testing continued through July and August 1968. By the end of August, SDICP was in regular use and the *IRON HORSE/SEEK DAWN* interface was declared operational on 15 September 1968.[42]

(U) (S) The TACC-NS was already digitally tied in with its alternate facility, the ATACC-NS at Udorn, Thailand. In the event the GSA-51 computer at TACC-NS became inoperative, the *IRON HORSE* data from the IU-1300 could be passed over a secure data link to the GSA-51 at the ATACC-NS. The *SEEK DAWN* system at TACC-NS and ATACC-NS now provided computer-to-computer inputs and display of the radar data from Udorn and Monkey Mountain with the *IRON HORSE* data.[43]

(U) (S) MTDS/NTDS and *COLLEGE EYE* EC-121 inputs to the system still required manual insertion into the GSA-51 computers at TACC-NS and ATACC-NS. Although the NTDS data link (link 11) became secure and NSA approval to pass *IRON HORSE* data to MTDS/NTDS was received in November 1968, software problems encountered in the CONUS tests of the SEA interface delayed implementation of the interface with MTDS/NTDS.[44]

SEA Interface Tested

(U) (CHVCO) In February 1969, a short operational test was conducted during which *IRON HORSE* track data was passed from TACC-NS to MTDS/NTDS. To accomplish this, the CP-818 computer containing the *SEEK DAWN* interface computer program was placed in the "backup" configuration. This permitted the transmission of selected *IRON HORSE* tracks to MTDS/NTDS, but prevented the exchange of Air Force tracks and receipt of Marine or Navy tracking data. In this configuration, the *IRON HORSE* tracks were passed directly from the CP-818 to the OU-40, rather than being sent from the GSA-51 computer.[45]

(U) (CHVCCO) During the test, only "hostile" or "unknown" category tracks were sent. This operational testing revealed that there were no problems in the CP-818 portion of the system; however, there were a few communications problems. The installation of Crypto Ancillary Units (CAU) at both Monkey Mountain TACC-NS and Marine terminals greatly improved the situation. There also were some operational problems at the MTDS end of the link in connection with track management--dropping of tracks, etc. However, these were resolved prior to the deployment of the SEA interface to the theater.[46]

(U) (S) During the May-June 1969 time frame, the SEA Interface System was again formally tested in the CONUS. On 5 June 1969, CINCPAC declared the system technically feasible and directed deployment and operational testing. The SEA Interface Implementation Force convened at TACC-NS on 16 and 17 June 1969. The Technical Committee met and formulated schedules for conducting the joint segment checkouts of the test. Since *IRON HORSE* was not able to participate, approval was obtained to simulate the *IRON*

HORSE input by use of a simulator tape.[47]

(U)(S) The initial tests were conducted on 26 June 1969 between TACC-NS and MTDS to checkout operation of the system in both the backup and normal configurations. Step 1 was the individual checkout by each service of its own part of the system and was completed prior to beginning Step 2, which was the joint checkout. All test objectives were met and, following the test, the Interface was left operating one way to TACC-NS.[48]

(U)(S) Output from the GSA-51 computer to the CP-818 computer was blocked so that the Air Force data would not be inadvertently transmitted to MTDS/NTDS prior to conducting the remaining Step 2 tests which would be with both the Marines and the Navy.[49]

(U) (S) The second and final series of tests were successfully conducted during the early hours of 5 July 1969, again using paper tape input. When the *IRON HORSE* system became operational on 21 July 1969, it was immediately incorporated into the SEA Interface System. The SEA Implementation Force held its final conference at Udorn RTAFB, Thailand, on 4-5 August 1969. Since there were no problems noted, the Committee recommended acceptance of the Interface operations at that time.[50]
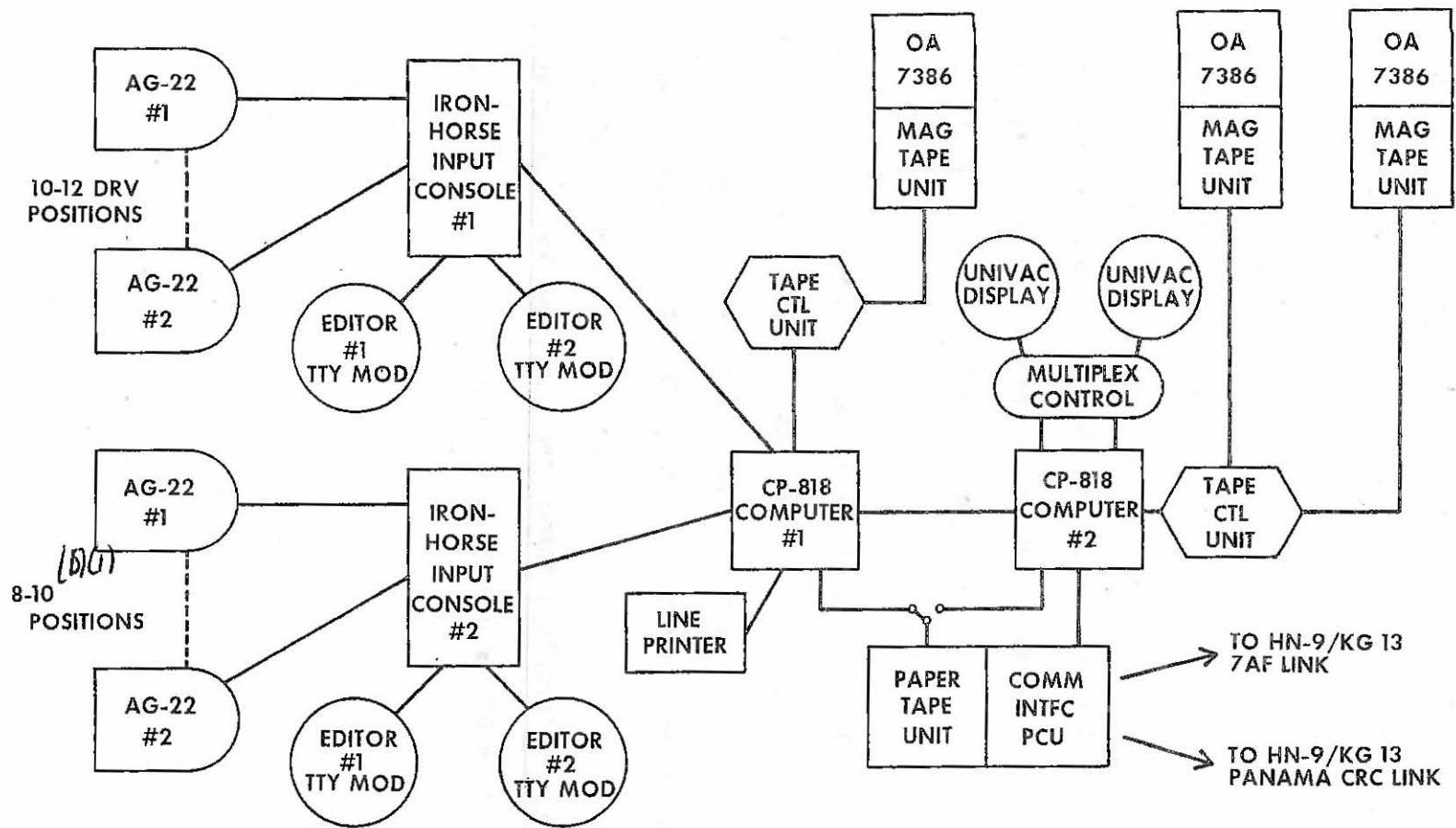
IRONHORSE SYSTEM

Chapter III

SUPPORT COORDINATION ADVISORY TEAM

(U) (SHVCCO) Early in 1968, the composition of the 6924th Scty Sq's op-
erating location on Monkey Mountain and its mission began undergoing
changes. The squadron's Monkey Mountain site had been operating for some
time primarily as a very high frequency (VHF) collection facility. The
facility had six installed positions, enough space for a small analytical
function, an office for the officer-in-charge (OIC), and a small communi-
cations facility for maintaining the KW-26 OPSCOMM circuit with the Da Nang
mainsite. The operating location also served as a backup facility for the
HAMMOCK system.[1]

TACC-NS SI Billets Increased

Causes Increase in Operating Location's Workload

(U) (SHVCCO) As the tempo of the war accelerated, an increasing number
of TACC-NS personnel required access to special intelligence (SI) material.
With the increased authorizations to indoctrinate these people for Cate-
gory III Communications Intelligence (COMINT), the operating location be-
came more involved with assisting the Air Force Special Security Office
(AFSSO) 7AF in the administrative aspects of giving indoctrination brief-
ings and debriefings and the associated paperwork. Since a larger number
of TACC-NS personnel were cleared for access to SI material, a greater de-
mand was placed upon the operating location to provide SIGINT direct
service.[2]

(U) (SHVCCO) Initially, the direct service required the maintenance of
current intelligence files and summaries for the daily perusal by these
SI-cleared people. The direct service requirements increased as the

49

*COMBAT LIGHTNING** and *SEEK DAWN*/ programs developed in the tactical con-
trol system on Monkey Mountain. Scores of SI-cleared visitors to the
TACC-NS were given briefings by the OIC of the operating location. The
IRON HORSE system components in the TACC-NS building required 24-hour
unscheduled and scheduled maintenance support and system operational
monitoring.[3]

Operating Location's Mission Changes

To Move to TACC-NS Building

(U) (S//CCO) The significant operational changes on Monkey Mountain dur-
ing late 1967 and early 1968 resulted in organic and functional changes
within the squadron's operating location. During the first half of 1968,
there was a restatement of the mission of the operating location, a re-
vamping of the manning authorizations and utilization, and a relocation
of facilities and direct service functions.[4]

(U) (S//CCO) Within the newly constructed TACC-NS building located on
Monkey Mountain, there were spaces designed and reserved for Project *YOGI
BEAR*./ Since the *YOGI BEAR* system was still under development, the like-
lihood of delivery in Fiscal Year (FY) 1969 was remote. It was recommended,
therefore, that the programmed spaces be used on an interim basis by the

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* Project name for the 7AF command, control, and warning system in
SEA.

/ Project name for the interface of the 7AF TACC-NS command and con-
trol system.

// An NSA concept to provide for the complete collection, real time
dissemination, immediate processing and reporting, and rapid utilization
of enemy tactical voice communications to permit more positive direction
and control of U.S. aircraft by a battle commander.

YOGI BEAR/IRON HORSE ROOMS IN TACC-NS BUILDING

TACC-NS BUIC II
SCOPES

BATTLE COMMANDER &
STAFF

YOGI BEAR ROOM

ROOM 108-A

IRON HORSE

ROOM 108-B
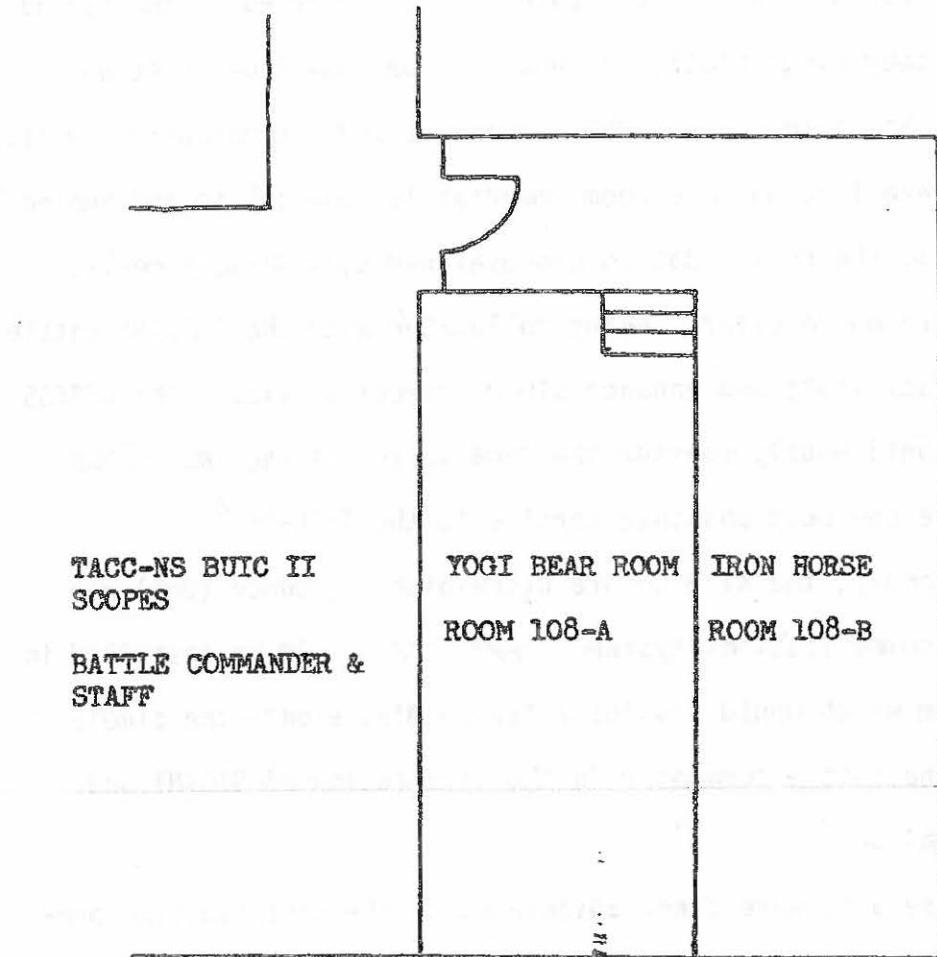
squadron's operating location.   Col. William D. Frymire, Director of the

TACC-NS, began pushing for the operating location's occupancy of the *YOGI*

BEAR room in January 1968.[5]

6924th Scty Sq Proposes Consolidation of Functions

(U) ~~(SHVCCO)~~ In February 1968, the 6924th Scty Sq proposed to the 6922nd

Scty Wg that the operating location's functions be consolidated at a

single location.   Since the *IRON HORSE* components and communications units

for the TACC-NS were located in a room immediately adjacent to and behind

the *YOGI BEAR* room, the consolidation proposal had considerable merit.

The advantages were quite clear.   Being collocated with the TACC-NS battle

commander would facilitate and enhance SIGINT direct service.   The USAFSS

personnel could continuously monitor the receive end of the *IRON HORSE*

display and assure the best possible service to the TACC-NS.[6]

(U) ~~(SHVCCO)~~ Secondly, the KY-8 secure ultra-high frequency (UHF) air-

ground-air voice communications system *(COMFY SILK)* could be installed in

the *YOGI BEAR* room which would provide a "third dimension"--the timely

ACRP input--for the battle commander in the correlation of SIGINT and

U.S. radar information.[7]

(U) ~~(SHVCCO)~~ There also were other advantages to the consolidation pro-

posal.   Among these were the elimination of the USAFSS security police

requirement on Monkey Mountain, a single work center for simplified super-

vision, the elimination of the KW-7 *SEEK DAWN* teletype circuit, the great-

er accessibility of the special intelligence reading files for the TACC-

NS consumers, and the enhanced ability of the USAFSS operating location

personnel to provide feedback of U.S. radar data to the mainsite.[8]

(U) ~~(SHVCCO)~~ The operating location had mission tasking for only two

of the six installed very high frequency (VHF) collection positions on Monkey Mountain. The feasibility of moving these two positions into the *YOGI BEAR* room was investigated. Since the VHF productivity on Monkey Mountain averaged only 3.9 in 1967, the 6924th Scty Sq proposed placing the positions in an installed, unmanned status.[9]

6922nd Scty Wg Response Favorable

(U) (SCW) The initial response from the 6922nd Scty Wg was that the consolidated proposal had many desirable features and, if approved, would significantly enhance SIGINT direct service to the TACC-NS. The wing's response encouraged the squadron to proceed with plans for the *YOGI BEAR* room. The wing, while being in favor of the proposal, requested clarification and additional data on several points. Questions arose concerning the installation of the VHF radio telephone positions and the antenna leads in the TACC-NS facility. Other questions involved the OPSCOMM arrangement and the proposed elimination of the USAFSS security police requirement.[10]

USAFSS Interested in Establishment of a SCAT

6922nd Scty Wg Forwards SCAT Proposal

(U) (SCW) Concurrent with the exchange between the squadron and wing concerning the consolidation proposal, USAFSS expressed interest in establishing a Support Coordination Advisory Team (SCAT) on Monkey Mountain. After considerable dialogue between the 6924th Scty Sq and the 6922nd Scty Wg, the wing forwarded a SCAT proposal to the Pac Scty Rgn for submission on to USAFSS. The wing proposed:[11]

1. Transfer all USAFSS functions being performed in the Monkey Mountain operations building to the *YOGI BEAR/IRON HORSE* area in the TACC-NS building.

2. Designate the *YOGI BEAR/IRON HORSE* area as an SI-cleared area.

3. Relocate two VHF radio telephone positions to the *YOGI BEAR* room and reconfigure them from VHF to HF/VHF.

4. Reterminate the existing KW-26 OPSCOMM circuit into the *YOGI BEAR* room.

5. Close the existing operations building and convert it into a storage area.

Accreditation a Problem

(U) (SI-CCO) The immediate problem involved in implementing the consolidation proposal was that of getting the *YOGI BEAR* room accredited as an SI-cleared area. The accreditation problem had been recognized earlier and the TACC-NS sought 7AF assistance in the matter. Accordingly, 7AF sent a representative to inspect and determine if the area could be made SI-secure. After inspecting the area, however, he advised both TACC-NS and the 6924th Scty Sq that, since the area would be occupied by USAFSS personnel and equipment, the accreditation was a USAFSS responsibility.[12]

(U) (SI-CCO) On 27 February 1968, the 6924th Scty Sq advised the Pac Scty Rgn of the situation and requested prompt action in getting the facility inspected and certified. When no action had been taken by mid-March, TACC-NS asked 7AF assistance in getting the area accredited. Seventh AF referred the matter to AFSSO PACAF, but still nothing was done. Finally, on 18 March, the 6922nd Scty Wg, in a strongly worded message to the Pac Scty Rgn, requested immediate accelerated action be taken to get the area accredited. This time, Pac Scty Rgn responded immediately, recommending to USAFSS that Capt. David R. Lorance, the 6924th Scty Sq operating location OIC be appointed the certification officer. A few

days later, USAFSS granted authority for Captain Lorance to perform the accreditation inspection.[13]

(U) (SHVGCO) Meanwhile, on 19 March, the 6924th Scty Sq asked USAFSS for a waiver to USAFSSM 205-7 for the operating location's use of the *YOGI BEAR/IRON HORSE* room for special intelligence. The waiver was requested for the anti-intrusion alarm system requirement, security police entry control requirement, and two other items concerning solid wall construction and air conditioning ducts.[14]

(U) (SHVECO) Then on 28 March, the 6924th Scty Sq ad ised the Pac Scty Rgn that special intelligence operations would begin from the *YOGI BEAR/IRON HORSE* room on 2 April, even though the operating location would not move until almost four months later. Meanwhile, USAFSS had approved the squadron's request for waiver of USAFSSM 205-7 requirements.[15]

USAFSS Has Reservations About Wing's SCAT Proposal.

(U) (SHVGCO) During this period, USAFSS had been studying the 6922nd Scty Wg's SCAT proposal, but had some reservations about approving it. Command officials were mainly concerned about using space which had been earmarked for the *YOGI BEAR* installation. However, the 6922nd Scty Wg stuck by its original proposal, pointing out to USAFSS that productivity of the two VHF positions was constantly less than 60 minutes of copy during a 24-hour period.[16]

(U) (SHVECO) Consequently, the wing suggested closing the two positions since the *COMBAT APPLE* and *COMBAT LANCE* ACRP projects were providing 24-hour coverage in the Gulf of Tonkin, which satisfied the VHF mission assignment. Further, the wing proposed sanitizing the operating location's building and retaining the VHF positions in a contingency status. Then

the Chinese linguists could perform SCAT functions, but still be available on Monkey Mountain to provide a quick reaction capability for manning the contingency positions.[17]

USAFSS Convinced

(U) (SHVCCO) After considering the wing's arguments, USAFSS agreed to place the VHF positions in a contingency status. As a result, on 22 July 1968, the operating location moved all except the collection facilities to the TACC-NS building and began operating in the YOGI BEAR/IRON HORSE rooms.[18]

SCAT is Organized

(U) (SHVCCO) At the same time, the operating location's personnel became known as the Support Coordination Advisory Team (SCAT). The 6924th Scty Sq developed a plan for the SCAT function to be manned by a complement of 12 personnel. The breakdown included a captain as OIC, a senior master sergeant as NCOIC, six analysts, and four Chinese linguists to man the work center on a 24-hour basis and provide an immediate on-call response capability for activating the contingency positions in the old operating location building. At that time, the SCAT was assigned the following responsibilities:[19]

1. Advisory and amplification service to HAMMOCK and IRON HORSE reports. This service was provided 24 hours daily and was accomplished by the SCAT activity via OPSCOMM with the mainsite surveillance and warning center.

2. Significant data input received from the ACRP via the COMFY SILK circuit was passed to the TACC-NS battle commander. This service provided correlations of the ACRP intercepted data with HAMMOCK/

IRON HORSE data; *e.g.*, types of aircraft, numbers of aircraft, base of origin, destination, whether the aircraft were instructed to activate weapons, North Vietnamese ground controlled intercept (GCI) controller instructions, and other pertinent and significant information that was of tactical value to the battle commander.

3. Interpretative and advisory service concerning SIGINT matters. This involved close coordination with the mainsite surveillance and warning center supervisor *via* secure communications in order to perform timely analysis of significant SIGINT activities and events to satisfy the queries received from TACC-NS personnel.

4. Maintaining a central repository of current SIGINT reports; *e.g.*, CRITIC, SPOT, etc., for immediate review by TACC-NS personnel cleared for special intelligence.

5. Special intelligence indoctrination service was provided by the SCAT officer and NCOIC. This included assisting personnel in preparing necessary forms to be forwarded to the Air Force Special Security Office, Seventh Air Force (AFSSO 7AF).

6. Presentations of SIGINT orientation briefings to very important persons (VIPs) and visitors cleared for special intelligence on a recurring basis.

7. Passing the TACC-NS daily MIG/SAM/Border Warning reports *via* the OPSCOMM circuit to the 6924th Scty Sq for relay transmission to NRV(C), 7AF Warning Center, and (b)(1)

8. All pertinent COMINT tracking activity outside a defined geographical area, which the TACC-NS battle commander desired, was passed *via* OPSCOMM circuit from mainsite to the SCAT activity for delivery to

cleared TACC-NS personnel. The battle commander requests were passed by the SCAT activity to mainsite for action.

9. When NSA required U.S. radar reflections of *SENIOR CROWN*[*] missions, the information was obtained from TACC-NS by the SCAT activity, prepared in proper format and transmitted *via* OPSCOMM to mainsite for relay to SIGINT Support Group (SSG) Det, 7 AF.

10. Issuing the following reports on a daily basis:

   a. Radio Frequency Interference (RFI) reports.

   b. Morning reports.

   c. Equipment status reports.

   d. *COMFY SILK* reports.

   e. *COMFY RICE* reports.

11. Performing OPSCOMM circuit checks with the 6922nd Scty Wg every two hours.

12. Activating the 6922nd Scty Wg (USA-57) OPSCOMM circuit whenever the 6924th Scty Sq (USA-32) was neutralized due to communications outages, power failures, rocket attacks, or other reasons, to insure necessary SIGINT direct service support to the TACC-NS.

13. Maintaining one 24-hour Daily Hours of Coverage (DHOC) VHF radio telephone position on an on-call status to be activated when required by ACRP air or ground abort and on special request.

SCAT Operation Refined and Improved

(U) (SHVCCO) With the physical move of operating location personnel and functions to the TACC-NS building, it was possible to further refine and

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[*] SAC SR-71 *GIANT SCALE* photo reconnaissance missions.

improve the operation of the SCAT. As experience and proficiency in the use of associated communications equipment and analysis of various inputs increased, so did the services available to TACC-NS.[20]

(U) (SHVCCO) The COMFY SILK terminal was located in the special intelligence accredited area adjacent to the TACC-NS operations room. One of the TACC-NS IRON HORSE display consoles was also located in the area next to the COMFY SILK terminal. This allowed the SCAT analyst to take console actions to obtain amplifying data on specific IRON HORSE tracks for the purpose of correlating them with tactical voice reflections relayed by the ACRP over the COMFY SILK net.[21]

(U) (SHVCEO) Significant information, including correlation of IRON HORSE and COMFY SILK data, was passed by the SCAT analyst to the TACC-NS battle commander over a direct secure line. Conversely, the battle commander used the line to initiate requests for information from the ACRP which might amplify any non-IRON HORSE reflections (such as NTDS) he might hold of hostile aircraft activity. This continuous dialogue between the SCAT and the battle commander became an integral part of the operating location's operations.[22]

Monthly SCAT Correlation Summary Established

(U) (CHVECO) Because of the high interest of USAFSS and NSA in the SCAT operation, especially concerning correlation of IRON HORSE/COMFY SILK activity, a monthly SCAT Correlation Summary was established. The electrical report was initiated on 30 August 1968, and the first report, covering the period 15-31 August 1968, was released on 5 September 1968. Subsequent reports were issued monthly until April 1969. The summary provided the total attempted correlations, percent successfully correlated,

reasons (if known) for unsuccessful correlations, and general remarks concerning the SCAT correlation function.[23]

(U) (CHVCCO) Information for the report was compiled from daily logs of *IRON HORSE* and *COMFY SILK* activity maintained by SCAT analysts. During December 1968, there were 295 successful correlations, representing 68 percent of the 432 *COMFY SILK* reflections and 54 percent of the 544 *IRON HORSE* reflections on North Vietnamese and/or CHICOM air activity.[24]

(U) (CHVCCO) To assist in the correlation process performed by the SCAT, a *SEEK DAWN* Interface Computer Program (SDICP) change was requested in September 1968. The requested change, although originated by the operating location, was submitted by TACC-NS to protect the direct service aspect of the operating location.[25]

(U) (CHVCCO) To take the *IRON HORSE* console actions required in performing correlations with *COMFY SILK* information described above, it was necessary to place SDICP in a backup configuration. This action did not have any adverse effect on the existing system; however, once the SEA Interface was fully implemented, it would remove the automatic interface with MIDS/NTDS.[26]

(U) (CHVCCO) To solve this problem, a change was requested to provide the capability to take the required console actions in the normal configuration, thus not interfering with the automatic interface.[27]
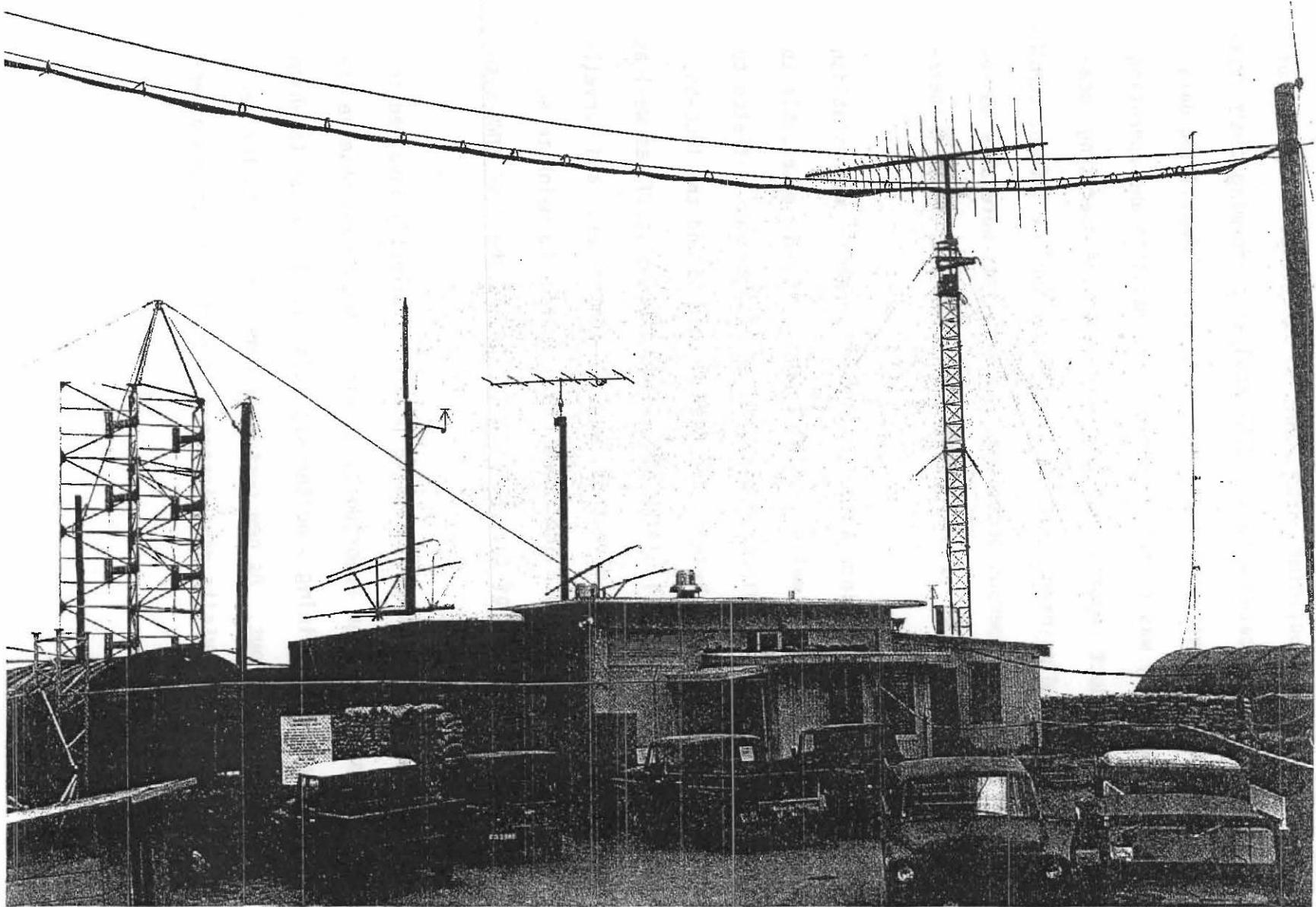
Collocation Has Many Advantages

(U) (SHVCCO) Physically collocating the operating location with the TAC C-NS brought additional advantages to the SCAT functional area. The OPS COMM circuit (1J24) between Monkey Mountain and the 6924th Scty Sq main site at Da Nang was moved from the old Monkey Mountain operations

General view of Operations Compound, Monkey Mountain

building to the TACC-NS building, Room 108A, in June 1968. The value of this circuit being collocated with the SCAT analyst performing *COMFY SILK/ IRON HORSE* correlations was confirmed many times over. Amplifying data on significant activity was exchanged between the mainsite and operating location; SIGINT product reports were transmitted to the operating location for the continued maintenance of reading files for the TACC-NS COMINT-cleared staff; and, on numerous occasions, SCAT analysts were able to relay information from an ACRP to the mainsite when *COMFY SILK* was inoperative at Da Nang.[28]

(U) (SHVGCO) A special reading table for TACC-NS personnel was established in the SCAT area, thereby making SIGINT reports far more accessible to those personnel than was previously possible. A program was initiated to exchange visits of personnel between the 6924th Scty Sq and the TACC-NS. By October 1968, virtually all of the SI-cleared TACC-NS staff, as well as the battle commanders, senior directors, weapons controllers, and surveillance technicians from the rotating crews, had visited the mainsite to gain a better understanding of the *IRON HORSE* input to the *SEEK DAWN* system which they operated.[29]

(U) (SHVGCO) By the same token, mainsite personnel directly involved in the *IRON HORSE* system had an opportunity to visit TACC-NS and observe the system in its entirety, gaining a better appreciation of the use to which their product was being put. As new personnel were assigned to the respective units, exchange visits were arranged as part of their job orientation.[30]

Chapter IV

AMMUNITION DUMP DISASTER

(U) *(C)* The morning of 27 April 1969 began just like any other spring morning at Da Nang AB. It was a warm and humid day with very few clouds in the sky. The base was conducting "business as usual." The constant roar of afterburners could be heard as F4 Phantom jets of the 366th Tactical Fighter Wing (TFW) scrambled for their missions in support of Allied operations. At the 6924th Scty Sq, Baker Flight had relieved Dog Flight and assumed responsibility for the day watch. It was a Sunday morning and most of the personnel assigned to day operations were off, leaving a skeleton crew to perform essential functions. Maj. Ronald M. Jacobs was in command of the 6924th Scty Sq in the absence of Lt. Col. James L. George, who was in Hawaii on Rest and Relaxation leave. No one had any way of knowing that by the end of the day the operational facilities of the 6924th Scty Sq would be 80 percent destroyed or that the squadron would have successfully executed an emergency destruction of all classified material.

The Disaster

Marine Corps Ammunition Dump Explodes

(U) *(C)* About 1100 hours on 27 April 1969, the 6924th Scty Sq was notified by the Da Nang Central Security Control that the Marine Corps ammunition dump on the west perimeter of the base was on fire. By 1130, the fire was out of control and had already spread into adjacent ordnance storage areas. Building 1600, the 6924th Scty Sq's operations building, had already sustained two heavy concussions which caused moderate damage to the interior of the building, but no structural damage. There was

Da Nang Air Base, South Vietnam
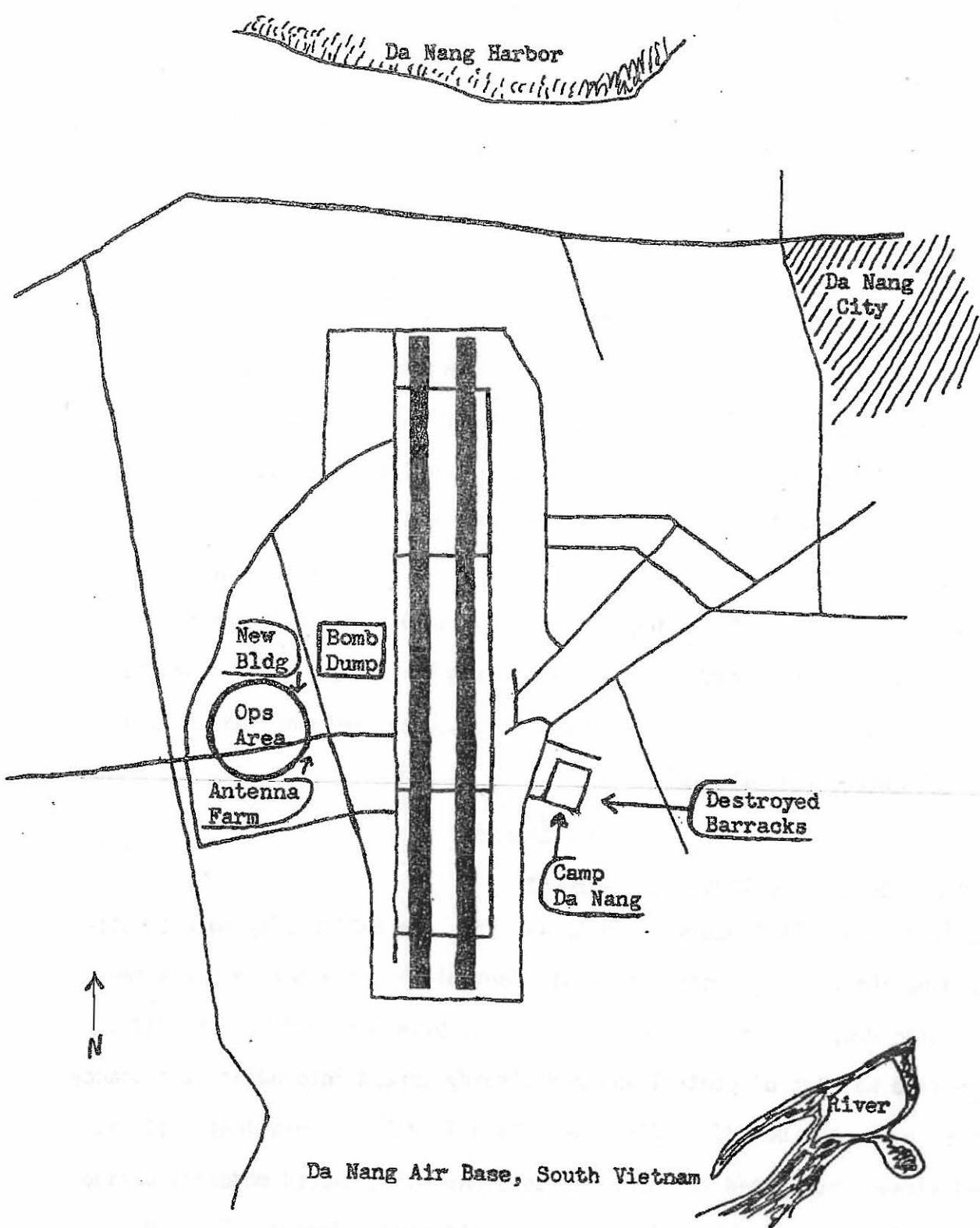
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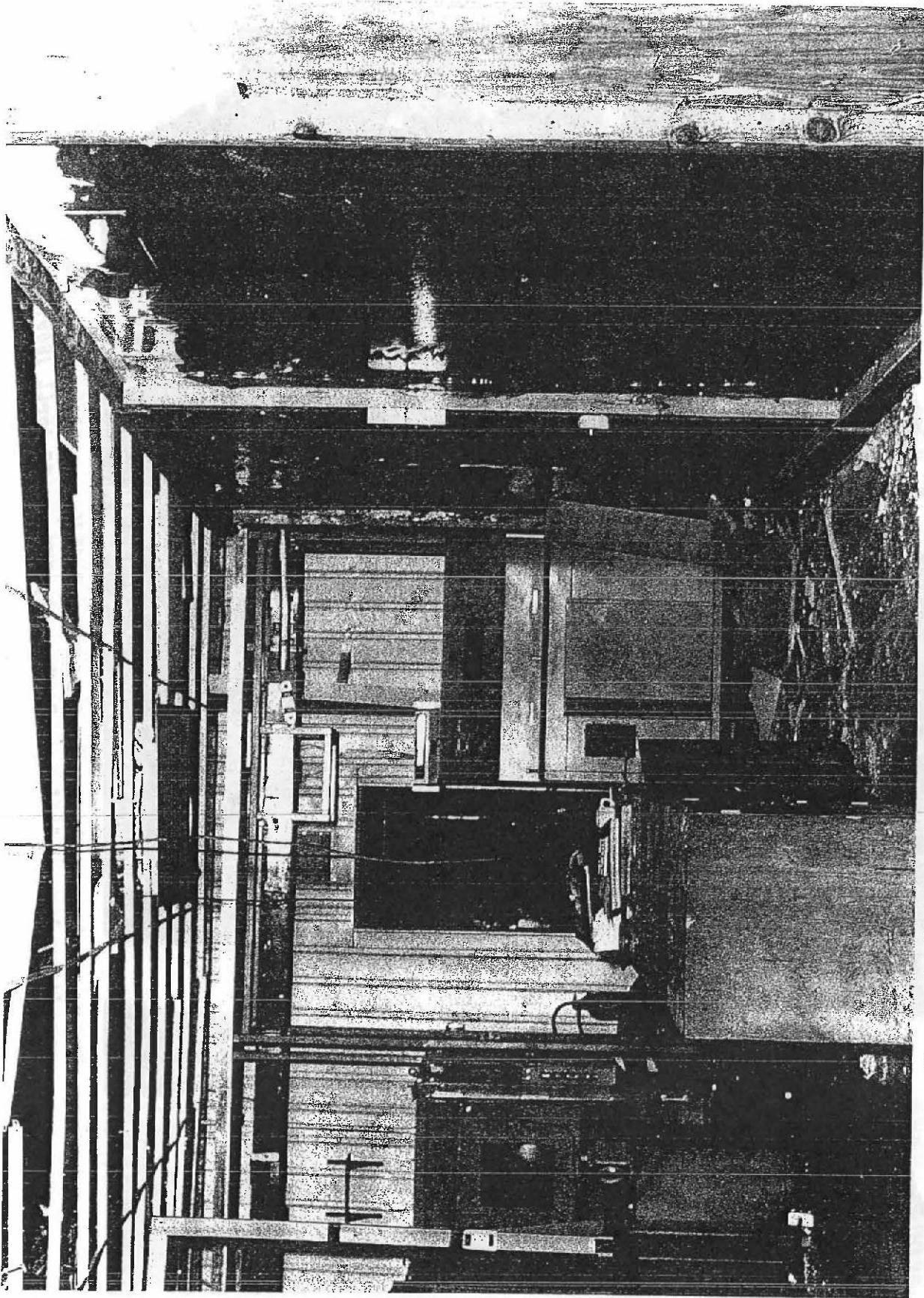
Damage to the 6924th Scty Sq Operations Building resulting from the ammunition dump explosion on Da Nang AB, RVN, on 27 April 1969.

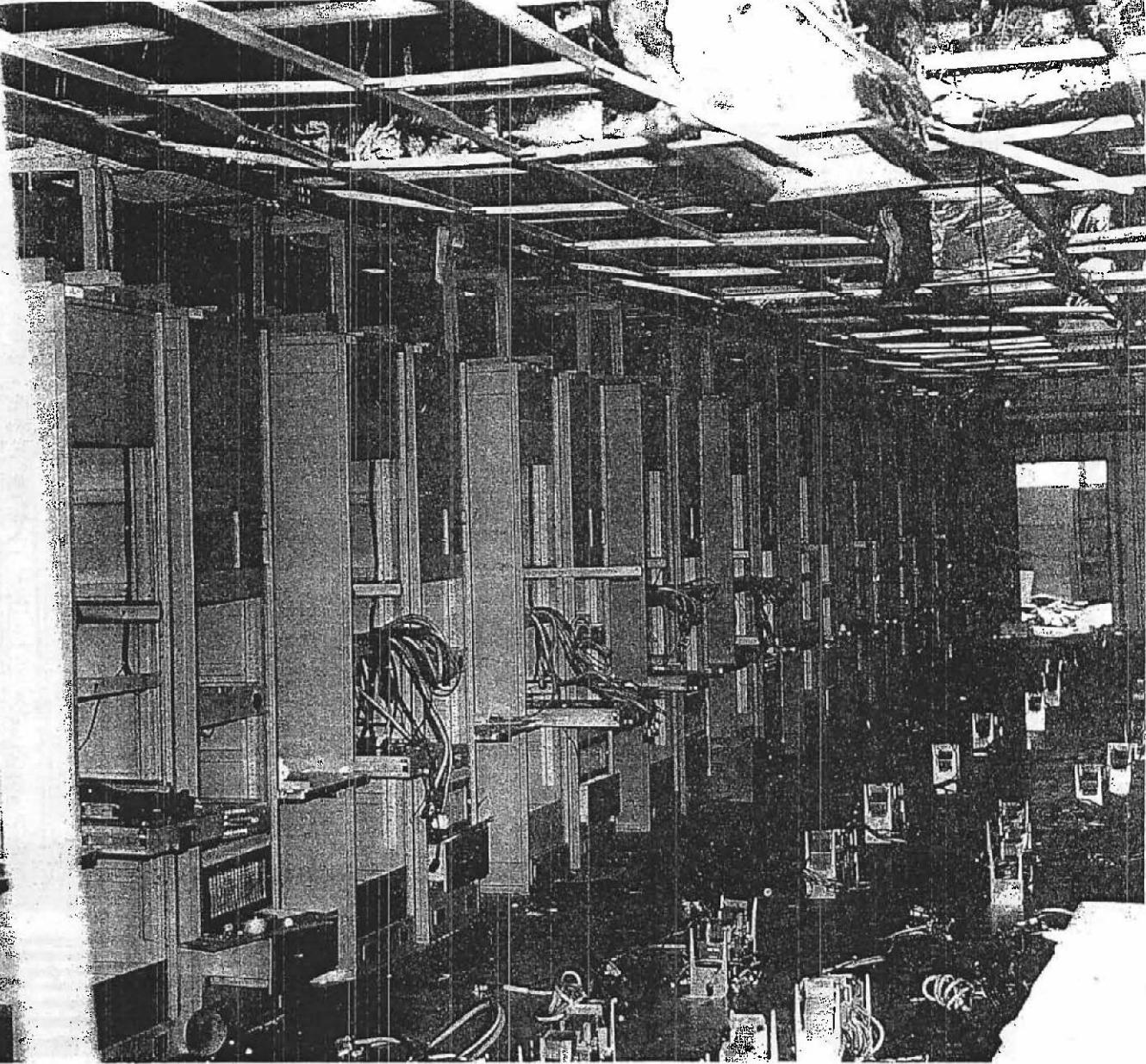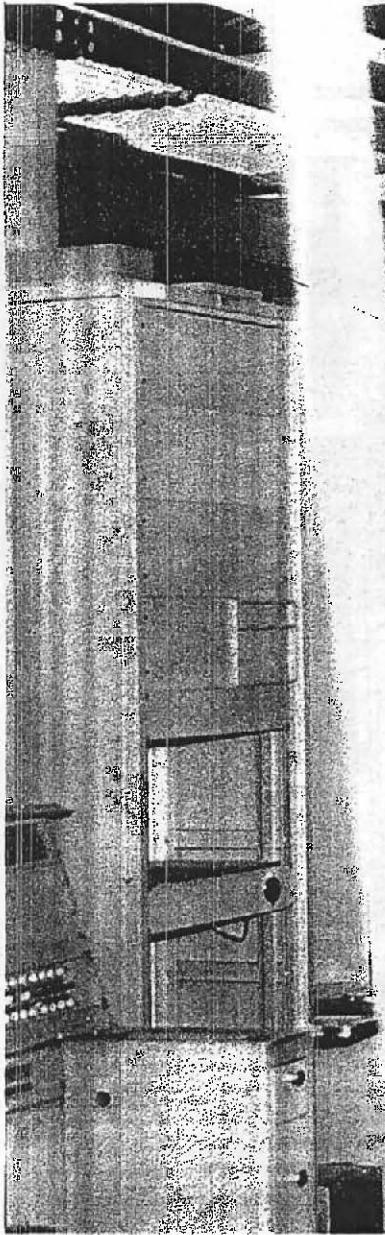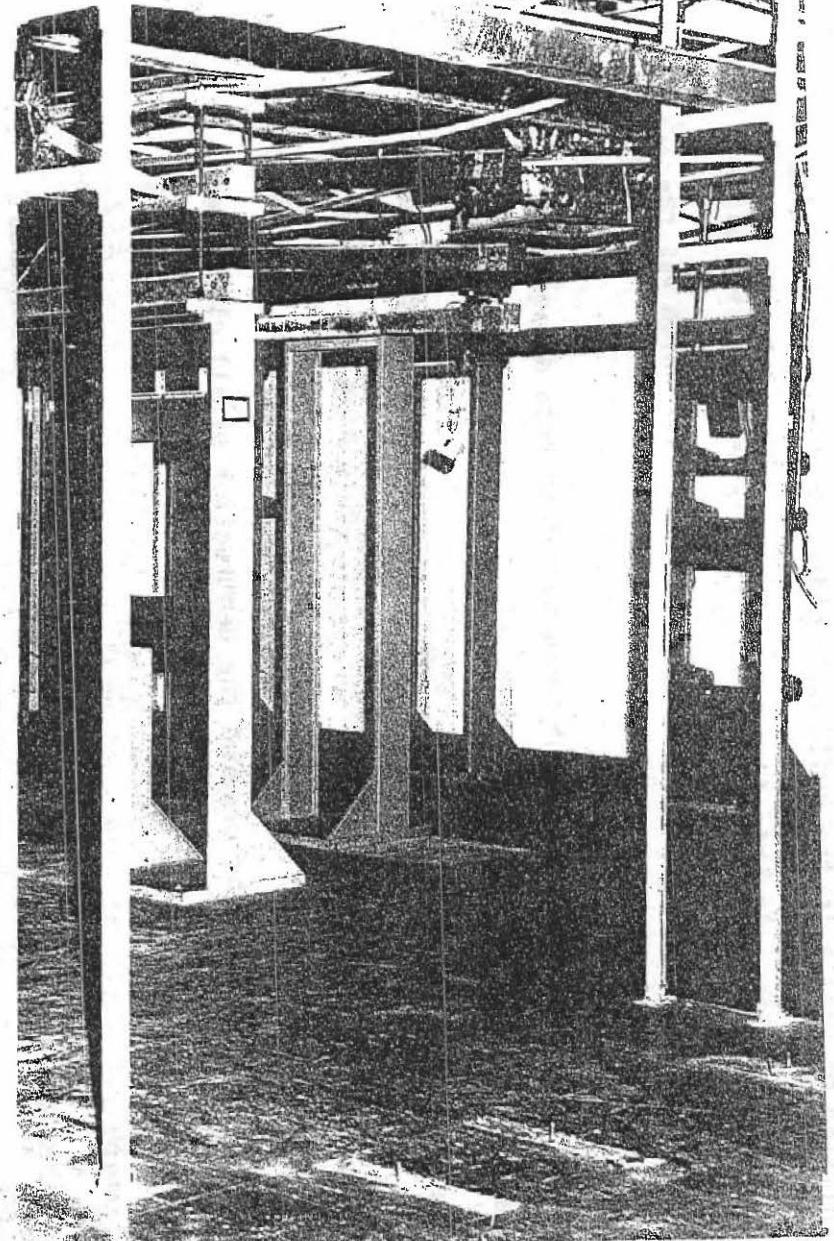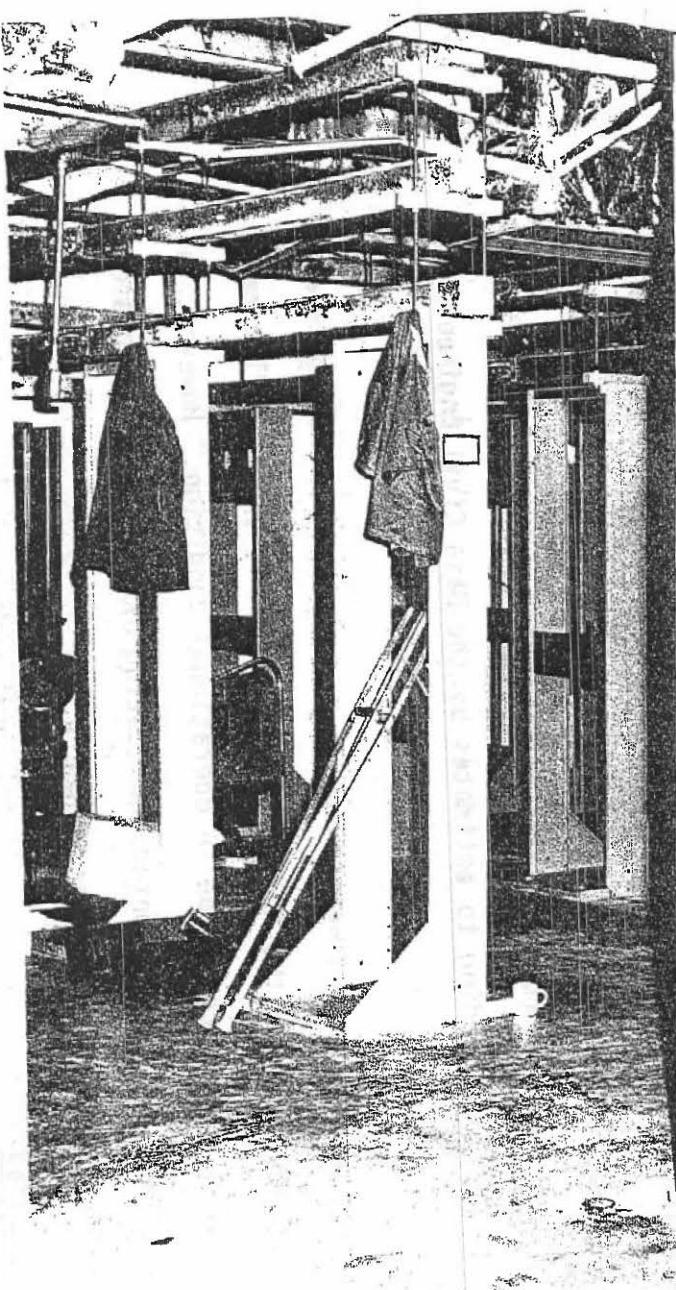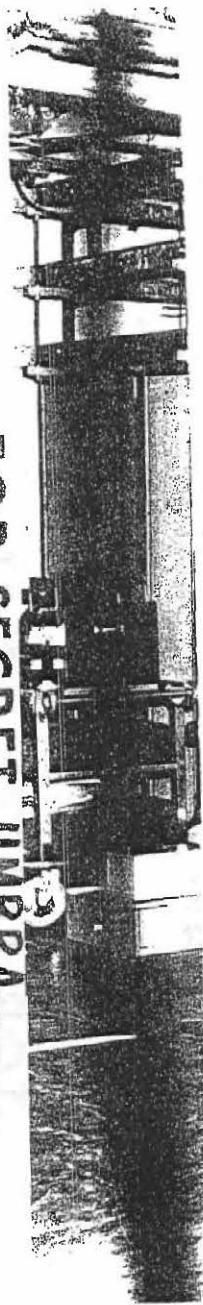*Damage to the 6924th Scty Sq Operations Building resulting from the ammunition dump explosion on Da Nang AB, RVN, on 27 April 1969.*

Damage to the 6924th Scty Sq Operations Building resulting from the ammunition dump explosion on Da Nang AB, RVN, on 27 April 1969.

67

some shifting of panels in the building's siding, and much of the false ceiling had fallen in. At this time, all classified material was placed in desks or safes, except for a small amount of material which was required in the exploitation area.[1]

(U)(C) By 1230, the operational area had sustained such damage that Major Jacobs shutdown all operations and ordered the building evacuated to insure the safety of all personnel. The situation continued to worsen, with fire spreading into adjacent storage areas containing the larger types of ordnance. By 1430, when it was obvious that the area would have to be evacuated, Major Jacobs ordered the destruction of all classified materials.[2]

The Aftermath

(U)(C) The morning of 28 April 1969 clearly revealed the tremendous amount of damage that the ordnance explosions had caused. Damage to property, power sources, and equipment prevented the squadron from functioning as an operational unit. The squadron operations building was 80 percent destroyed according to estimates by the Base Civil Engineers (BCE).[3]

(U)(C) No physical damage was caused to any of the intercept or associated equipment. None of the antennas showed any damage, and all communications equipment appeared to be in operational condition. However, the lack of electrical power prevented the testing of the equipment to ascertain if there had been any internal damage.[4]

AICP Implemented

(U)(S-CCO) While the ordnance in the Marine ammunition storage areas was still exploding, plans were made to insure that SIGINT support to SEA

commanders would be maintained with a minimum loss of mission coverage.
At 1141 on 27 April, Major Jacobs implemented the Alternate Intercept
Coverage Plan (AICP) at USA-57 (6922nd Scty Wg, Clark AB, Philippines)
and USA-29 (Det 4, 6922nd Scty Wg, Udorn, Thailand). At that time, com-
munications were established between USA-57 and AFSSO 7AF and between
USA-57 and the 6924th Scty Sq's operating location on Monkey Mountain.
For the next month, the 6924th Scty Sq's intercept mission was accomp-
lished from Monkey Mountain. Using eight intercept positions, signifi-
cant tracks were voice-told to TACC-NS over the *HAMMOCK* circuit.[5]

(U) (CHVCCO) This data was either manually entered into the *SEEK DAWN*
computer for display at the BUIC-II consoles or manually plotted on the
display board in the TACC-NS operations room.[6]

IRON HORSE System Out of Commission

Facilities to be Reconstructed at Da Nang

(U) (C) In late May 1969, the 6924th Scty Sq resumed limited operations
at the Da Nang mainsite; however, the *IRON HORSE* capability was not be be
restored until sometime during July 1969. Meanwhile, the USAFSS commander
had taken the position that any question of relocating the operational
facilities from Da Nang had been resolved after the rocket attack on Da
Nang in 1967. He maintained that the determining factors dictating the
rebuilding of facilities at Da Nang in 1967 were still valid. Conse-
quently, this ruling dictated the continued operations at Da Nang and
necessitated reestablishing essentially the same operational posture as
had existed prior to the destruction of the operations building.[7]

(U) (C) Meanwhile, civil engineers from 7AF had visited the site and
agreed with the damage estimate made by BCE personnel. In order to allow

the 6924th Scty Sq to return to normal operations, they offered the following options:[8]

1. Repair existing facilities within the compound for storage and limited service capabilities.

2. Use of a large van complex, which would be airlifted in by USAFSS, and split operations between Da Nang and Monkey Mountain.

3. In order to avoid the use of vans, erect two 40X100-foot structures in the area behind the operations facilities to provide air conditioned space and permit reinstallation of salvaged equipment. This would allow a minimal acceptable operational capability. Estimated time for completion was 90-150 days.

4. To replace the destroyed facilities, construct two PASCOES buildings of 80X100 feet on the existing foundation with a 15-foot wide center section to connect the two buildings. Time required for the PASCOES construction would be 120-150 days.

TACC-NS Wants IRON HORSE Restored

(U) Meanwhile, TACC-NS was exhibiting an avid interest in the restoration of the squadron's *IRON HORSE* capability. They offered approximately 2,000 square feet in their common digitizer building on Monkey Mountain for the operational use of the 6924th Scty Sq. The major drawback of this offer was the fact that TACC-NS could not supply logistic support for sufficient people to use the space. Billeting at the base camp was very limited and the support facilities were already over-taxed. As appealing as the prospect of collocation with TACC-NS was to the squadron, it had to be rejected as a permanent solution.[9]

USAFSS Outlines Four-Phase Reconstruction Plan

(U) (C) Since it was not possible to relocate to Monkey Mountain, the 6922nd Scty Wg stated that the immediate alternative in reestablishing an operational capability was to erect some type of prefab shelter or establish mobile facilities. However, if a mobile solution was selected, it would necessitate a major crating, packing, shipping, or storing task for the 6924th Scty Sq. The shortage of crating material at Da Nang would generate a major problem avoiding the use of a large van complex.[10]

(U) (SHVECO) USAFSS finally solved the dilemma on 7 May 1969, informing the 6924th Scty Sq that the Da Nang operational facilities would be reestablished on-site and outlined a four-phase reconstruction plan:[11]

1. Phase I called for the immediate establishment of an intermission in order to continue support to TACC-NS and 7AF. This support capability would be split among the 6922nd Scty Wg, Det 4 of the 6922nd Scty Wg, and the 6924th Scty Sq's operating location on Monkey Mountain.

2. Phase II required the deployment and operation of sufficient Emergency Reaction Unit (ERU) resources at the mainsite at Da Nang to provide manual *HAMMOCK* in-country support. Coverage of other significant targets, previously assigned to the squadron, were to be reestablished at the mainsite. This would be accomplished by using four S-141 intercept shelters. The 13 manual Morse and three HF radiotelephone positions in these vans would provide interim manual support to TACC-NS in place of the *IRON HORSE*. If existing facilities would not accommodate support of the intercept tasking, five additional vans would be made available to the 6924th Scty Sq's Surveillance and Warning (S&W) Section, OPSCOMM circuits, analysis

section, data preparations, and distribution section. Only the required communications facilities necessary to support the ERU mission would be established. Maintenance would be performed from either a van or in a reconstructed building.

3. Phase III called for an interim operation employing AN/GGC-15-equipped intercept positions and the reactivated *IRON HORSE* system which was to be reinstalled in M-313 vans. A 40X100-foot PASCOE building would be required to house Phase III operations and would be built on the concrete pad previously used as the basketball court. The M-313 van complex housing the *IRON HORSE* system would be tied into the S&W section. Communication terminals would remain in the temporary facilities established for Phase II operations. Establishment of Phase III capability would commence upon initiation of Phase II operations. Estimated time for completion of Phase III was 90-120 days, which would allow time for the *IRON HORSE* system to be returned to NSA for rehabilitation, update modification, and installation in M-313 shelters.

4. Phase IV would be the rebuilding of the mainsite with the same capability that existed prior to 27 April 1967. Selection of the type of structure and method of construction would be determined at a later date.

6922nd Scty Wg Given Reconstruction Responsibility

(U) On 18 May 1969, USAFSS designated the commander, 6922nd Scty Wg as the responsible authority for attaining Phases I, II, and III of the restoration. In brief, these three phases were defined as: Phase I - current mission; Phase II - installation of ERU assets at the mainsite

to provide *HAMMOCK* support; and Phase III - reinstallation of the *IRON HORSE* system. Phase IV authority, the rebuilding of a permanent site at Da Nang, was retained by USAFSS.[12]

(U) The 6924th Scty Sq recommended immediately after the disaster that the *IRON HORSE* system be configured for van operations as the quickest solution for attaining Phase III capability. There was some uncertainty as to how or when the squadron would have a restored operations facility. Initial thinking was that the reconstruction would be a van complex with self-help required to restore the damaged buildings to house the *IRON HORSE* system and other sections.[13]

USAFSS Requests Damage Assessment

(U) (U) USAFSS requested an assessment of the damage to the *IRON HORSE* system and whether or not Clark AB had the capability to overhaul and test the system. However, the 6924th Scty Sq was unable to give an assessment of any electrical or mechanical damage because of a lack of power and space in which to test the equipment. There was no physical damage noted on any of the system components, and the system was functioning properly when the power began to fluctuate. It was necessary at that time to shut down the system to avoid possible damage to the sensitive mechanisms. To provide as much protection as possible, the maintenance personnel had removed the *IRON HORSE* system and all associated equipment (cables, generators, etc.) from the damaged building and placed it in air conditioned storage areas.[14]

(U) (U) Based on the squadron's limited assessment of the damage, USAFSS decided to have the *IRON HORSE* system overhauled and tested at Clark AB instead of sending it back to NSA. It was estimated that this would reduce the time required to restore the *IRON HORSE* system from 120 days to

74

approximately 90 days.[15]

(U)(C) USAFSS requested that all equipment and associated personnel be dispatched from the squadron to the 6922nd Scty Wg at Clark AB. All *IRON HORSE* components were to arrive no later than 23 May 1969. Additional programming and technical personnel would be sent TDY from USAFSS to assist in the restoration, and NSA would be asked to supply engineering and programming support. All personnel were to be in place prior to 26 May 1969.[16]

(U)(C) Barring any major damage to the equipment, the electrical checks and system testing could be accomplished by 9 June 1969. The *IRON HORSE* system would be ready for installation in the temporary quarters constructed for Phase III by mid-June 1969. If it was necessary to install the system in vans, the target date would be late-June 1969.[17]

(U) However, the 6922nd Scty Wg suggested that the *IRON HORSE* system be restored on-site once the temporary quarters for Phase III were established. The reasons behind this suggestion were: (1) a major problem of packing and handling of the components would arise if the system was restored at Clark AB; (2) the potential for additional damage caused in the multiple handling and subsequent shipment of hardware; (3) a critical shortage of packing materials at Da Nang; and (4) restoration on-site would reduce the outage time to a minimum.[18]

USAFSS Directs Immediate Restoration of IRON HORSE

(U)(C) On 18 May 1969, HQ USAFSS directed the 6922nd Scty Wg to restore the *IRON HORSE* system to its operational capacity in the quickest time possible. Whether this was accomplished by on-site restoration or in a van configuration would be decided by the wing. USAFSS informed NSA that

the 6924th Scty Sq had been directed to leave the *IRON HORSE* system as it was until it could be reinstalled in the Phase III facilities. Any engineering or technical assistance would be supplied from CONUS resources. NSA was requested to prepare the M-313 vans in case it was necessary to install the *IRON HORSE* system in a van complex.[19]

Loss of Trained Analysts Concerns 6924th Scty Sq

(U) (SHVECO) Meanwhile, the 6924th Scty Sq had become concerned about the loss of trained and proficient analysts to support and operate the *IRON HORSE* system. With the system out of commission, no supplemental training program could be established within the unit to insure that there was no loss of expertise when *IRON HORSE* was back in operation. In order to have experienced personnel available and to maintain the high standards that TACC-NS had desired in the past, the squadron recommended that several changes be included in the special operational training (SOT) conducted at NSA. The squadron was about to enter into the SEA interface program and the following proposed additions to the SOT program would help insure that a supply of adequately trained personnel was available:[20]

1. Include detailed training in all aspects of the NVN air structure.

2. Present specific instruction of the S&W center's reporting criteria and how it was related to the 6924th Scty Sq's direct support to TACC-NS.

3. Insure that familiarization of all components was attained.

4. Present a working knowledge of system I operations to include the special intercept requirements and procedures unique to *IRON HORSE* operations.

5. Present practical demonstrations on scope operations.

6. Include procedures and quality control techniques employed during the daily computerized ELFAIR production.

    (U) The 6924th Scty Sq felt that the inclusion of these recommendations in the training of analysts would fulfill an immediate need when the system was restored to operation. Further, the squadron felt that it would provide for the input of more proficient personnel and would reduce training time on-the-job, resulting in a more productive utilization of personnel associated with the *IRON HORSE* program.[21]

    (U) With the destruction of classified material during the April disaster, it was necessary to have detailed reporting instructions (RIs) for *IRON HORSE* operations reaccomplished. With the near achievement of Phase II goals, the 6924th Scty Sq began writing RIs for the *IRON HORSE* system. These RIs included directions and guidance on the use of the system in a direct support role, responsibilities of the operators and analysts, on-line and off-line processing, etc. The reaccomplishment of these RIs commenced on 24 May 1969 and was completed prior to the operational acceptance of the restored *IRON HORSE* system. Much of the work required the experience and knowledge of the assigned personnel as many of the documents requested for *IRON HORSE* support had not arrived.[22]

    (U)(C) The squadron initiated a formal three-week training program to familiarize additional analysts with the functions and operations of the *IRON HORSE* system. The initial classroom training was held on 2 June 1969. The curriculum for this course was similar to the recommendations that were made to expand the SOT course at NSA. In addition to being briefed by the maintenance personnel and inspected the various *IRON HORSE*

components that were in storage. This training included simulated live on-line TACC-NS direct support requirements, edit analyst operations, scope familiarization, reporting criteria, and computer operation. The squadron ended the training program on 21 June 1969.

Power Restored to IRON HORSE System

(U)(C) *RED HORSE* restored power to the *IRON HORSE* system on 11 June 1969, and the 6924th Scty Sq's maintenance personnel were then able to start a checkout of the system. Space was again a critical problem because only one console could be connected to the system at one time. When the maintenance personnel checked out one console and declared it fully operational, it had to be disconnected and the second console connected and tested.[23]

(U)(C) Air conditioning in the building was another problem because when the *IRON HORSE* equipment was running it caused overheating of the components. This restricted the number of components that could be turned on and tested at any given time. All system components had been turned on, but only for a very limited amount of time due to the overheating problem. Several minor discrepancies were noted during the checkout, but all the problems were corrected by 14 June 1969.[24]

(U)(C) The system checked out correctly under the limited test conditions; however, it was not possible to run a checkout of the entire system due to space and temperature restrictions. Once the system was transferred to the Phase III building, it would have to be rechecked to insure that no problems had arisen as a result of the relocation.[25]

(U) The *IRON HORSE* system moved a step closer to installation within the 40X80-foot building on 22 June 1969 when *RED HORSE* relocated the first

400-cycle generator to the pad on the north end of the building. The second generator was still being used to run a test on the software for training purposes.[26]

Implementation of Phase III Imminent

(U) During July 1969, the 6924th Scty Sq was engaged in final pre-parations for implementing Phase III of the recovery plan. On 5 July 1969, the new operations building was informally accepted. Formal ac-ceptance was delayed until completion of official Air Force documenta-tion.[27]

(U)(SHVECO) The 6924th Scty Sq decided to implement Phase III in four steps to insure no loss of mission during the change over:[28]

1. Phase IIIa called for the transfer of the entire Phase II mission from the temporary van configured complex to the floor of the new operations building, to include activating all support positions and one additional manual Morse position.

2. Phase IIIb was the activation of four manual Morse positions in van one.

3. Phase IIIc was the activation of four additional manual Morse posi-tions in van two.

4. Phase IIId would conclude the implementation of Phase III with the activation of four radio telephone positions in van three.

Phase III Implemented

(U)(SH) Effective at 0001Z, 21 July 1969, the 6924th Scty Sq imple-mented Phase IIIa operations in the new facility. At that time, the on-line *IRON HORSE* system went operational passing real time data to TACC-NS. The transfer was successful and no mission capability was lost. Effective

24 July 1969, one additional manual Morse position was established, completing Phase IIIa.[29]

(U) (SCW) With the activation of Phase IIIa, the 6924th Scty Sq successfully returned the *IRON HORSE* to operational status. This system had been inactive since 27 April 1969. Beginning on 21 July 1969, the *IRON HORSE* system became the primary means of providing SIGINT direct service to TACC-NS for the immediate use of the TACC-NS battle commander.[30]

HAMMOCK Reverts to Backup Status

(U) (S) Meanwhile, the 6924th Scty Sq continued to maintain *HAMMOCK* as the primary backup to the *IRON HORSE* system. Whenever the *IRON HORSE* system was unable to provide SIGINT support to TACC-NS, *HAMMOCK* was activated. *HAMMOCK* communications consisted of a KY-8 secure voice circuit and was used to pass significant data to TACC-NS for use by the battle commander.[31]

(U) (S) An HY-2 secure voice circuit between the 6924th Scty Sq and its operating location on Monkey Mountain was used as a backup to the *HAMMOCK* system. In addition, the OPSCOMM circuit between the two sites could be used as a tertiary backup to the *IRON HORSE* system. *HAMMOCK* was activated daily for approximately four hours while the daily ELFAIR segments were processed and the system programmers were working on the *IRON HORSE* system. Also, *HAMMOCK* was the primary means of supplying direct support to TACC-NS during Phase II of the recovery program.[32]

IRON HORSE Test Program Conducted

(U) (SEW) Between 1 January and 14 April 1970, an extensive *IRON HORSE* test program was in effect. Sixteen software errors were discovered which had to be resolved before the full potential and utilization of

a new *IRON HORSE* program could be realized. This program not only involved in-house personnel, but included programmers from the Systems Development Corporation at MMOB. With the cooperation of NSA, all 16 programming errors were resolved by 15 April 1970.[33]

Many Maintenance Problems Experienced

(U) During January and February 1970, many problems were experienced in maintenance of the *IRON HORSE* system. These problems consisted primarily of computer halts and tape drive parity errors. The difficulty in locating the cause of the computer halts was aggravated when the symptoms disappeared during trouble-shooting before the faulty component could be isolated. However, on 23 February 1970, a faulty printed circuit board was located and replaced, solving the problem of computer halts. The excessive tape parity errors were caused by badly worn heads on the magnetic tape units. New heads were ordered and were replaced on four of the units on 27 April 1970. The remaining two were replaced on 5 May 1970, which solved the problem.[34]

Chapter V

IRON HORSE II

(U) (SHVCCO) Early in 1968 plans were well underway for the procurement of a second *IRON HORSE* system to serve as a backup to the *IRON HORSE* system in South Vietnam. On 27 March 1968, the backup system, which had been designated *IRON HORSE II*, moved a step closer to reality when HQ USAF approved $1.5 million in FY-68 funds for purchase of the system. The next day NSA informed USAFSS that the funds would be transferred to the command immediately; and as soon as an MIPR was received at NSA, procurement action would commence. USAFSS received the money on 4 April 1968, and the next day forwarded advance copies of the MIPR to NSA.[1]

Several Site Locations Considered

Udorn Primary Site; Others Also Considered

(U) (SHVCCO) The second *IRON HORSE* system was originally programmed to be installed at the alternate TACC-NS at Udorn, Thailand. However, in December 1968, USAFSS recommended to the Air Staff that *IRON HORSE II* be deployed to (b)(1)   instead. But in April 1969, AFNINCAC advised USAFSS that it could not support this recommendation since the system could not handle the entire air surveillance problem. During the same time frame, PACAF asked 7AF to evaluate the necessity for a full digital *versus* secure voice backup at Udorn and also asked 5AF to determine the need of an *IRON HORSE* type system to upgrade (b)(1) (b)(1)   capabilities.[2]

(U) (SHVCCO) Seventh Air Force replied that a secure voice manual system was acceptable as a backup to *IRON HORSE I* based on the assumption that the level of North Vietnamese air activity and U.S. air operational

81

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limitations would remain unchanged. Conversely, 5AF said it had an

urgent requirement for an *IRON HORSE* system in the Western Pacific

Northern area (WESTPACNORTH) and identified (b)(1) as the logical

location to service the entire area.[3]

(SHVCCO) Subsequent discussions among all concerned headquarters

had reached the point by mid-1970 where most were in favor of placing

IRON HORSE II in the WESTPACNORTH area and had narrowed the locations

down (b)(1)   Then, on 8

August 1970, Commander in Chief, Pacific (CINCPAC) submitted a formal

requirement to HQ USAF for a data display system (*IRON HORSE*-type equip-

ment) which would display friendly and hostile tracks in the WESTPACNORTH

area. On 20 August 1970, HQ USAF tasked USAFSS to provide the best pre-

liminary estimate of costs to install and employ an *IRON HORSE*-type sys-

tem in that area.[5]

(U) (SHVCCO) However, during a meeting at NSA on 1-2 September 1970,

a decision was made to postpone deployment of *IRON HORSE II* to either

SEA or the WESTPACNORTH area until further study could be conducted. NSA

was to explore an improved AG-22 terminal system (IATS)/*STRAWHAT* compati-

bility to the *IRON HORSE* system and expansion of the *IRON HORSE* software

to accept 48 input positions *vice* the 32 positions normally employed.[6]

(U) (SCW) The question of where to locate the *IRON HORSE II* system

was settled automatically in late 1970 when the decision was made to

deactivate the 6924th Scty Sq at Da Nang. With this decision came the

requirement to deploy the *IRON HORSE II* system to a suitable location in

SEA.[7]

Ramasun Station Selected for IRON HORSE II

(U) *(SC)* The obvious choice at that point seemed to be Ramasun Station in Thailand. However, due to the complexities surrounding the adjustment of the military personnel ceiling within Thailand, plus manning and billeting problems, this decision was held in temporary limbo. Little time was wasted, however, as DIRNSA identified the requirement to relocate the *IRON HORSE II* system to Thailand as early as November 1970. At that time, planning called for the installation of the *IRON HORSE II* system at Ramasun Station during 3QFY71 to provide a turnkey operation.[8]

NSA Calls IRON HORSE Meeting

(U) *(SC)* To get things rolling, NSA hosted a meeting on 1-2 December 1970 to define and agree on tasking for detailed actions required for installation of *IRON HORSE II*. Items identified for discussion included communications requirements, site preparation, manning, AG-22 installation schedule, transportation requirements, spares preparation, system installation, system testing, and the phasing of *IRON HORSE* operators from South Vietnam to Thailand.[9]

(U) *(S//CCO)* Shortly after the 1-2 December meeting, NSA issued formal authority to Det 4 of the Pac Scty Rgn (USA-29) to deploy the *IRON HORSE II* system to Thailand. Planning called for the *IRON HORSE II* equipment, including maintenance and spares, to be airlifted in three M-313 vans to arrive on-site not later than 1 March 1971. USAFSS was to provide one S-141 shelter, if required, for secure data/voice between USA-29 and Monkey Mountain.[10]

Pac Scty Rgn Sends Survey Team to Thailand

(U) *(C//CCO)* A Pac Scty Rgn site survey team visited USA-29 during

January 1971 to discuss support arrangements for the 6924th Scty Sq since it was being moved from Da Nang to Udorn. One of the first questions to surface concerned mission expendables for *IRON HORSE II*. It could not be immediately ascertained whether or not expendables would be the same as for *IRON HORSE I*. Consequently, the survey team asked Pac Scty Rgn to check out the listing of Federal Stock Numbers (FSNs) for all required mission expendables in order to facilitate local requisitioning.[11]

(U) (SHVECO) Another item of concern was the lack of input dates for assignment of maintenance personnel to Ramasun Station. Pac Scty Rgn was asked to check this out with USAFSS.[12]

(U) (CHVECO) The site survey team also noted that the GGC-15 equipment installed at USA-29 did not contain the parallel output interface cards which would be required to interface the manual Morse positions with the *IRON HORSE* data console (OJ-74). Local Army maintenance and supply offices could give no assurance that the required quantity could be obtained by the required date of March 1971. Therefore, the team requested USAFSS to ensure that all of the GGC-15 equipment to be forwarded for station expansion be equipped with the required printed circuit boards.[13]

(U) (SHVECO) Further, the survey team noted that for proper operation of the *IRON HORSE* system, intercept positions would have to be equipped with SSG-238s (audio switching groups) or their equivalent. The breakdown for SSSG-238 requirements was as follows:[14]

Equipment	Number
Manual Morse Controller	2
MB0029	27
Army SIT	2
OPSCOMM Area	1
S&W Supervisor	2
Mission Supervisor	2
MB0032	1

The team felt that this setup would allow for each programmed manual
Morse position to be connected to the *IRON HORSE II* system. The switch-
ing group for the Army SIT was to maintain intercom capability to Air
Force operators from the Army SIT/RFP position. The site survey team
completed its study and coordination on 22 January 1971.

7th RRFS to Construct Van Complex

(U) (SHVGCO) Decisions resulting from this site survey tasked the Ramasun
Station host organization; *i.e.*, the 7th Radio Research Field Station (RRFS),
to construct a van complex to the rear of the existing operations building
which would house *IRON HORSE II* communications, maintenance, and analysis
functions. These vans were to be placed around a 16X34-foot building, ad-
joining the operations building, which would house the S&W center and the
IRON HORSE II display scopes. Construction of the S&W Center building be-
gan on 1 March 1971 and was completed on 8 March. The *IRON HORSE II* vans
arrived on 12 March and were in place with power connected on 17 March.
All equipment and communications were operational on 27 March, five days
before the scheduled mission transfer.[15]

Turnkey Mission to Assure Continuity

(U) (SHVCCO) The objective of the turnkey mission transfer was to assure continuity of SIGINT support being provided to TACC-NS and to other customers. To support this objective, the 6924th Scty Sq designed and implemented an emergency plan to maintain operations at Da Nang through the end of the radio day on 31 March 1971, while ensuring that personnel being transferred to Ramasun Station would be in place to accept the Da Nang mission at the beginning of the radio day on 1 April. [16]

(U) (SHVCCO) This plan included arranging for special airlift of 47 operational personnel, with baggage, from Da Nang AB to Udorn RTAFB, Thailand, and implementing two "frozen" 12-hour operational shifts at Da Nang until the unit at Ramasun reported acceptance of the mission. Sufficient qualified personnel were retained at Da Nang to dispose of 6924th Scty Sq residual resources after the mission had been transferred. [17]

(U) (SHVCCO) The plan was implemented on 27 March 1971 with the necessary personnel departing on priority airlift and with the frozen shifts being implemented at 0001Z, 27 March 1971. At 0001Z, 1 April 1971, the Da Nang mission was reported transferred and operational at Ramasun Station and, at that time, 6924th Scty Sq operations at Da Nang AB ceased. [18]

IRON HORSE I Shipped to NSA

(U) (C) With transfer of the 6924th Scty Sq to Ramasun Station, the *IRON HORSE I* system at Da Nang was shipped to NSA.

Chapter VI

ESTABLISHMENT OF ALTERNATE TACC-NS AT UDORN

(U) (S//CCO) By May 1972, it had been decided that if the TACC-NS had to leave Monkey Mountain because of military pressure, control of the air war over NVN would be shifted to the 7/13th Air Force Alternate Tactical Air Control Center, North Sector (ATACC-NS) at Udorn, Thailand. Just as the TACC-NS had been supported by the 6924th Scty Sq, the ATACC-NS would be supported by the 6924th Scty Sq.[1]

Planning for Move of TACC-NS Commences

Two Key Points Considered

(U) (S//CCO) Since no firm decision had been made as to when the TACC-NS would move, initial planning centered on two key points: (1) would the move be progressional, or (2) would a duplicate facility be established at Udorn with a turnkey operation when the TACC-NS closed?[2]

(U) (S//CCO) The first option would obviously produce deficiencies which might or might not be acceptable, depending on operational circumstances at the time. As for the second option, equipment and facilities--especially communications--simply were not available.[3]

Manual Operation Proposed As A Compromise

(U) (S//CCO) Consequently, as a compromise, 7/13th AF proposed a manual center (minus the *IRON HORSE* automated SIGINT processing system) for the ATACC-NS supported by a communications network which would not include interface with the Tactical Data System (TDS). The ATACC-NS would not be fully manned until actually called into operation to replace the TACC-NS. The communications system would be equipped with off-the-shelf or in-being equipment and hardware available either in-theater or from the CONUS.[4]

87

PACAF Not in Complete Agreement

(b)(1)

(U) (SC) PACAF wanted a dedicated secure voice circuit between the new ATACC-NS and the 6924th Scty Sq at Ramasun Station but had to settle for an OPSCOMM circuit between the squadron and the 7/13th AF AFSSO at Udorn with a secure voice link from there to the battle commander.[8] While this would slightly decrease the 6924th Scty Sq's SIGINT service to consumers, it would satisfy those agencies for the time being.

(U) (SC) The 6924th Scty Sq felt that the plotting could be "sanitized" in the 10X14-foot room* available and then called to a map board in the ATAC C-NS. The squadron had to man this room similar to the SCAT room on

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* The Navy's tactical data system directly supported carrier strikes from the Gulf of Tonkin, but it was expanded to include other users of such data, including the TACC-NS.

✝ This facility had formerly held the *SEEK DAWN*/BUIC II secure voice/ data comunications terminal, which was acceptable for SI material.

Monkey Mountain. Recognizing that the 7/13th AF facility could not accommodate an all-source ATACC-NS, PACAF had no intention at that time of making it anything more than a manual service (without *IRON HORSE* and the associated computers at Monkey Mountain). However, it did not rule out an automated service for the future.[9]

(b)(1)

(U) (SHVGEO) (b)(1)

Pac Scty Rgn felt that it could support the initial manual operation, particularly if the system paralleled that already in existence at Monkey Mountain, since the ATACC-NS would get the same traffic by OPSCOMM and secure voice that was going to TACC-NS.[13]

IRON HORSE Considered for ATACC-NS

(U) (SHVGEO) Seventh Air Force had already told 7/13th AF to direct its efforts toward a semiautomated system "as the ultimate." If this happened,

IRON HORSE had to be a part of it, but only two *IRON HORSE* systems were in existence, aside from the one on Monkey Mountain. One was at NSA and one at the Sacramento Air Materiel Area (SMAMA), McClellan AFB, California.[14]

(U) (SHVGCO) Meanwhile, the 6924th Scty Sq met with 7/13th AF, the 621st Tactical Control Squadron (TCS), the 7th RRFS, the Air Force Cryptologic Depot (AFCD), and USAFSS representatives at Udorn on 23 July 1972 to discuss ". . .all facets of support requirements, communication circuits, siting of a new TSC-56 van (which housed *IRON HORSE*) at Ramasun Station, and space required in the former *SEEK DAWN* facility to house all equipments in either a manual, semiautomated, or fully automated mode."[15]

(b)(1)

(U)   The demand for "all pertinent tracking data" in addition to one-liners would saturate the already hard-pressed OPSCOMM or secure voice communications from the 6924th Scty Sq, and the squadron felt that an addition to one-liner service would be superfluous. It said:[17]

> We envision the installation of a secure voice capability to ATACC-NS to provide for queries, answers, background information, and timely amplifications *vice* tracking data which is more expeditiously passed *via* one-liners, pending activation of the *IRON HORSE II* system. Upon activation of the secure voice/*IRON HORSE II* system, we anticipate ATACC-NS satisfaction with *IRON HORSE* input, as augmented by one-liners until their assumption of command and control responsibility from TACC-NS, at which time, secure voice direct support to TACC-NS would be transferred to ATACC-NS.

Apparently PACAF was looking for a return to the original manual *HAMMOCK*

direct SIGINT support system which had supported *ROLLING THUNDER* from early
1965 until it was replaced by the *IRON HORSE* system. The Region told PACAF
on 7 August that ". . .this is beyond our current capability," particular-
ly if the two control centers were to operate simultaneously.[18]

(U) (SHVCCO) The Region explained that it could not ". . .pass tracking
data *via IRON HORSE* to TACC-NS (Monkey Mountain) and simultaneously pass
the same information manually to ATACC (NS)." Only if the Monkey Mountain
center became totally inoperable, the Region concluded, could it envision
a *HAMMOCK* operation, ". . .and then only as an interim until *IRON HORSE II*
[became] operational at Udorn." The same day, however, a PACAF staff member
said ". . .due to the fluid situation in Southeast Asia," PACAF did not in-
tend to pursue upgrading ATACC-NS beyond the manual stage. The Region told
USAFSS that it was concerned that the "manual operation" could quickly change
into a full *HAMMOCK* support system.[19]

(b)(1)

(b)(1)

Buildup of ATACC-NS Starts

(U)(SHVCCO) Meanwhile, 7/13th AF went ahead and moved people into Udorn to man an alternate center. There were no further dealings with the 6924th Scty Sq at the time as far as supporting a manual center was concerned. The squadron was confident that it could provide the support, having a number of analysts assigned who had Monkey Mountain experience, but its capability would be limited. The squadron suspected that it might be called upon to initiate a full *HAMMOCK*-type manual operation, which it could not do. So, in mid-September 1972, the 6924th Scty Sq explained to Pac Scty Rgn just how far it would be able to go:[24]

> We envision that one-liner service will be more than adequate, with occasional queries [and] comments *via* secure voice. By that time our broadcast position in the SEC [*sic*] will be operational, and we are confident that the support desired by ATACC-NS can systematically be provided *via* one-liners, and that secure voice communications usage, beyond initial explanations, will be needed infrequently unless and until TACC-NS goes out. . . .

(U)(SHVCCO) This was less than PACAF wanted, so the Region told the 6924th Scty Sq to be sure that 7/13th AF people at Udorn understood what kind of service it intended to provide. Pac Scty Rgn stressed ". . .since the tenure of TACC-NS is uncertain and could be ended either through combat or drawdown actions at any time, we must be prepared to assume full manual operations."[25]

(U)(SHVCCO) At the same time, however, PACAF was telling 7/13th AF to plan for either of the options that Pac Scty Rgn had offered.[26] Both options brought some questions from the 7AF SSLO, Maj. Darrell Nope, who asked such questions as who would install the *IRON HORSE* equipment and how would the SCAT people be moved from Monkey Mountain for a turnkey operation?[27]

(b)(1)

6924th Scty Sq Must Be Ready for ATACC-NS Operation

(U)(S/VCCO) Seventh/Thirteenth Air Force was responsible for preparing the Programmed Action Directive (PAD) on the ATACC-NS, so Pac Scty Rgn looked to it for the first notice of requirements. There were still many details to be ironed out, as well as many uncertainties as to what kind of a facility it was going to be. However, the certainties had to be met, such as tasking, an internal concept of operations for the 6924th Scty Sq, available communications and terminal facilities at both Udorn and Ramasun Station, and housing for the automated facility if the ATACC-NS wound up as such. Also, plans for closing down the TACC-NS on Monkey Mountain and certifying the new buildings and locations to handle SI information had to be ready.[30]

(b)(1)

NKP Suggested as Possible Location for ATACC-NS

(U) (TSHVCCO) On 1 October 1972, 7AF added more confusion to the picture
by suggesting that the TACC-NS, when moved from Monkey Mountain, might
best be located in the Task Force Alpha (TFA) buildings at NKP.[32] The
7/13th AF agreed, as did PACAF, at least to the point of giving it further
study. However, PACAF added a word of caution by saying that the JCS had
not yet officially directed the phase-out of TFA. PACAF expected this con-
firmation, however, and told PACOM area engineers to survey the site.
Nevertheless, PACAF told all agencies to continue planning for a manual
ATACC-NS capability at Udorn as early as possible, anticipating a final de-
cision on that site selection by 1 November 1972.[33]

(U) (SHVCCO) On 27 October, USAF gave interim approval for processing SI
material at the ATACC-NS facility, but this interim accreditation was con-
tingent upon continuous manning by at least two SI-indoctrinated people.[34]

(U) (SHVCCO) Much of this was academic since 7AF still did not have enough
SI-indoctrinated people available to man the facility at the end of October.[35]
But at that time, TACC-NS was still scheduled to close on 1 December 1972,
and the ATACC-NS would have to be in position to assume the mission, at
least temporarily. USAFSS, therefore, had to keep SIGINT support viable
in some way. The command proposed that the *IRON HORSE* equipment at Monkey
Mountain be shipped back to NSA when the TACC-NS was closed and that the
SCAT personnel on Monkey Mountain be reduced to the operation of the SI
communications relay between activities in the Gulf of Tonkin and Thailand.
This would involve seven analysts (AFSC 202X0) and one cryptographic equip-
ment maintenance man (AFSC 262X0) and serve as an interim operation until
a more permanent solution to the communications relay problem was found.[36]

(U) (S/VCCO) At that point, however, the 6924th Scty Sq had no way of knowing how many people would be needed to man the TACC-NS (if it was reorganized at NKP) until the mode of operation was determined. Three separate modes had to be considered: (1) at NKP, with the 6908th Scty Sq assuming full support functions; (2) at Udorn, with all TACC-NS personnel SI-cleared and with only communications inputs being provided by the 6924th Scty Sq; and (3) a duplicate of the Monkey Mountain operation at either location, supported by the SCAT. Each option had different personnel requirements and the squadron had to prepare for all of them.[37]

(U) (S/VCCO) However, the 6924th Scty Sq was confident that it could support whatever system emerged. If the TACC-NS was reorganized at NKP, the SCAT would operate as it had on Monkey Mountain. At Udorn, the squadron could man and support the control center from Ramasun Station. At NKP, the 6908th Scty Sq said it could accommodate the TACC-NS, but the TFA buildings were doubtful. TFA was the best location, especially when considering the size of the *IRON HORSE* equipment, but the squadron advised that ". . .other agencies and headquarters have designs on TFA spaces."[38]

(U) (S/VCCO) The SIGINT support functions could be accommodated within the 6908th Scty Sq Surveillance and Warning (S&W) Center with three people performing the SCAT function. The squadron preferred this option with *TEA BALL** assuming some of the immediate liaison actions being handled by the 6924th Scty Sq's operating location (OLAA) on Monkey Mountain. However,

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* The *TEABALL*/WCC concept called for the real time relaying of SIGINT data to USAF weapons controllers located in the 6908th Scty Sq operations area. The weapons controllers used the data to enhance positive control of USAF aircrews over North Vietnam for both offensive and defensive purposes. (A detailed historical study of the *TEABALL*/WCC system is available in the HQ USAISS Historical Office.)

there would not be room for the *IRON HORSE* equipment outside TFA.[39]

(U) (TSHVGGO) Regardless of the final decision, Pac Scty Rgn had to plan

for the move. So, by 4 November 1972, the Region had advised PACAF of its

airlift requirements. Meanwhile, USAFSS had advised NSACSS that it was:[40]

> . . .planning to relocate OLAA of the 6924th Scty Sq and associated
> *IRON HORSE* equipment to the TACC-NS successor organization at NKP
> (possibly Udorn) to resume *IRON HORSE* support as soon as possible
> . . . . We are not aware of a firm decision as to what configura-
> tion the TACC-NS successor will take; *i.e.*, manual or semiautomated
> mode of operation. . . . It is not known if a Navy TDS data inter-
> face will be included in a semiautomatic scheme. Since our CP-818
> serves as an interface for NTDS data to the BUIC II, we will plan
> to relocate it to retain the interface capability until a decision
> is reached. . . . Assume combination of ATACC-NS and WCC will per-
> form TACC-NS functions until reconstitution is completed. We will
> adjust as necessary during this interim period.

Meanwhile, it had been decided that the TACC-NS mission would be trans-

ferred to ATACC-NS as a turnkey operation. However, since a second *IRON*

HORSE system was not available, a manual operation would have to be used

until the Monkey Mountain *IRON HORSE* consumer subsystem could be moved to

whatever location was selected. There were still many communications

questions to be answered and USAFSS recommended to NSACSS that an early

conference be held at Ft. Meade to include all SCAs ". . .to ensure that

in the predictable confusion of the pullout and reconstitution, the SIGINT

community continues to provide traditionally smooth and effective timely

support."[41]

MACV Recommends Udorn for TACC-NS

(U) (TSHVGCO) On 14 November 1972, MACV entered the picture by recom-

mending that the TACC-NS be moved to Udorn rather than NKP. This meant

that the manual ATACC-NS would have to fill the gap under reduced cap-

ability until *IRON HORSE* could be installed. Some officials at MACV were

not completely sold on the need for the fully automated system anyway,

anticipating a cease-fire agreement, but this assumption was not generally accepted. Meanwhile, 7AF further confused the issue by saying that *IRON HORSE* should be transferred from Monkey Mountain back to NSA for disposition if a cease-fire agreement was reached.[42]

(b)(1)

(U) (S/VCCO) On 21 November 1972, 7AF ordered all U.S. forces and equipment out of Da Nang, and the closure of TACC-NS on Monkey Mountain, effective 1 December 1972.[44] The ATACC-NS would assume its responsibilities in a manual mode. The 6924th Scty Sq had already told PACAF it could support the ATACC-NS from Ramasun Station and was prepared to do so.[45]

(U) (S/VCCO) However, a new consideration emerged. Since there was no longer any intention to interface with the TDS; *i.e.*, communications to transmit information from the Gulf of Tonkin and Navy sources to the ATACC-NS, Pac Scty Rgn told the 6924th Scty Sq ". . .it would appear that you could relocate some personnel to the ATACC and leave only those

required [at Monkey Mountain] for communications relay until that problem is resolved."[46]

(b)(1)

(U) (SHECO) On 24 November, the 6924th Scty Sq outlined personnel actions it planned to take to support an accredited ATACC-NS. Said the squadron:[49]

> Propose that three R202XOs (SIGINT analysts) and three R304X4s (teletype maintenance) which will be available upon the deactivation of the automated system at Monkey Mountain be transferred to the 6924th Scty Sq, Ramasun Station. The 202XOs will be used to augment flight operations while determining actual workload, and improving [and] altering procedures for support to the ATACC-NS. Although the ATACC-NS has requested one 202XO, we propose to send four, one from each flight. We feel this is important to ensure full support to the ATACC-NS, as well as aid liaison at the operating level between ATACC-NS and this unit. Additionally, the experience of the three 202XOs from the SCAT should be beneficial to both the ATACC-NS and this unit. I also propose to transfer one additional 202XO to 6924th Scty Sq, Ramasun Station as soon as he becomes available to allow assignment of one to each flight. This action will provide each flight one additional man to call plots/amplification to the ATACC-NS.

After 30 days of test, the squadron planned to settle on actual manpower

(b)(1)

Move of TACC-NS Postponed

(b)(1)

(b)(1)

(U) (SCW) However, President Nixon's intensified bombing campaign quickly convinced the North Vietnamese that continued hostilities would not be in their best interests. Consequently, on 28 January 1973, the two nations reached a cease-fire agreement. A month later, on 28 February 1973, the 6924th Scty Sq's operating location (OLAA) on Monkey Mountain was deactivated. The *IRON HORSE* user unit, which had supported the battle commander at TACC-NS, was disassembled and shipped to the 6922nd Scty Gp at Clark AB, Philippines, for rehabilitation and storage. Closure of the Monkey Mountain site also ended the requirement for the AN/TSC-56V(1) Communications Central (mobile van), so it also was shipped to the 6922nd Scty Gp for possible use in other cryptologic areas.

(U) (SHVECO) With the closure of OLAA, Admiral Noel Gayler, CINCPAC, summed up his appreciation for nearly a decade of SIGINT service to combat forces in SEA. Said Admiral Gayler:[57]

I wish to express my appreciation for the outstanding performance of OLAA, 6924th Security Squadron during the high tempo operations in SEA. Following your deployment to Monkey Mountain in early 1960 [*sic*], USAFSS personnel quickly became highly respected for their important contributions to *HAMMOCK* and *IRON HORSE* systems. Your outstanding professionalism and dedication contributed significantly to the effectiveness of the Tactical Air Control Center, Northern Sector operations. My congratulations and thanks to all hands for a job well done. Gayler.

(U) (SHVCO) As U.S. forces withdrew from South Vietnam, the *IRON HORSE* system at Ramasun Station was used primarily for displaying the flight routes of reconnaissance missions over SEA until 6 November 1973 when DIRNSA ordered withdrawal of *IRON HORSE* from operational status. Originally, it was planned that the *IRON HORSE* system would be interfaced with the newly installed IATS. However, difficulties in obtaining interface components prevented this from happening.[58]

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Glossary

A

ACRP	Airborne Communications Reconnais- sance Program
AFCD	Air Force Cryptologic Depot
AFSSO	Air Force Special Security Office
AICP	Alternate Intercept Coverage Plan
ATACC-NS	Alternate Tactical Air Control Center- North Sector

B

Brig. Gen.	Brigadier General

C

CAU	Crypto Ancillary Unit
CHICOM	Chinese Communist
CINCPAC	Commander in Chief, Pacific
CINCPACAF	Commander in Chief, Pacific Air Forces
COMINT	Communications Intelligence
CONUS	Continental United States
CRC	Control and Reporting Center
CRP	Control and Reporting Post
CRT	Cathode Ray Tube

D

DHOC	Daily Hours of Coverage
DIRNSA	Director, National Security Agency

113

E

E&I   Engineering and Installation

ECM   Electronic Countermeasures

ELFAIR   Electronically Forwarded Machine Re-
             trievable Data of Air Activity

ERU   Emergency Reaction Unit

EW   Electronic Warfare

F

FSN   Federal Stock Number

FY   Fiscal Year

G

Gen.   General

GEOREF   Geographical Reference

H

I

IATS   Improved AG-22 Terminal System

IRAN   Inspection and Repair as Necessary
             (No longer in use. See PDM.)

IU   Interface Unit

J

JCS   Joint Chiefs of Staff

JSPC   Joint Sobe Processing Center

K

L

M

Maj.	Major
MCN	Mission Control Note
MTDS	Marine Tactical Data System

N

NM	Nautical Miles
NRV(C)	NSA Representative, Vietnam (C)
NSA	National Security Agency
NTDS	Navy Tactical Data System
NVAF	North Vietnamese Air Force
NVN	North Vietnam
NVNOCC	North Vietnam Operations Control Center

O

OIC	Officer-in-Charge
OPSCOMM	Operations Communication

P

PACAF	Pacific Air Forces
Pac Scty Rgn	Pacific Security Region
PAD	Program Action Directive
PDM	Programmed Depot Maintenance (See IRAN)

R

RAD	Radio Arbitrary Designator
RFI	Radio Frequency Interference
RI	Reporting Instructions

RRFS   Radio Research Field Station

S

S&W   Surveillance and Warning

Scty Gp   Security Group

Scty Sq   Security Squadron

Scty Wg   Security Wing

SDICP   *SEEK DAWN* Interface Computer Program

SEA   Southeast Asia

SI   Special Intelligence

SIGINT   Signals Intelligence

SMAMA   Sacramento Air Materiel Area

SOT   Special Operational Training

SSG   SIGINT Support Group

SVN   South Vietnamese

T

TAC C-NS   Tactical Air Control Center-North Sector

TAC S   Tactical Air Control System

TCS   Tactical Control Squadron

TDS   Tactical Data System

TDY   Temporary Duty

TEC HINS   Technical Instructions

TFA   Task Force Alpha

TFW   Tactical Fighter Wing

U

UHF   Ultra-High Frequency

| USAF | United States Air Force |
| USAFSS | United States Air Force Security Service |

$\underline{V}$

| VHF | Very High Frequency |
| VIP | Very Important Person |

$\underline{W}$

| WCC | Weapons Control Center |

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6913 Scty Sq	1	DO	1
6916 Scty Sq	1	DOM	1
6917 Scty Gp	1	DOR	1
6921 Scty Wg	1	DC	1
6922 Scty Sq	1	DOY	1
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